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To Mr. G. V. Sudworth
with the sincere regards
of L. R. Abrams

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A PHYTOGEOGRAPHIC AND TAXONOMIC
STUDY OF THE SOUTHERN CALIFORNIA

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BY

LEROY ABRAMS, A.M. (LELAND STANFORD JR. UNIVERSITY)

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY, IN THE FACULTY OF
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A PHYTOGEOGRAPHIC AND TAXONOMIC
STUDY OF THE SOUTHERN CALI-
FORNIA TREES AND SHRUBS

BY LEROY ABRAMS

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A Phytogeographic and Taxonomic Study of the Southern California Trees and Shrubs

BY LEROY ABRAMS

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PREFACE

In the study of the trees and shrubs of southern California I have endeavored to discuss the phytogeographic as well as the taxonomic features, as trees and shrubs, being long-lived and non-migratory, furnish excellent material for phytogeographic observations. The present paper is the result of field studies carried on along these lines for a number of years, together with an examination of specimens in the principal herbaria of the United States.

Many helpful suggestions in the study of the phytogeographical

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problems have been obtained from Coville's "Botany of the Death Valley Expedition," Parish's "Sketch of the Flora of Southern California," and Hall's "Survey of San Jacinto Mountain," as well as from Merriam's paper dealing with his system of life zones, which latter I have adopted.

Acknowledgments are most heartily given to the following persons for the loan of material, or for assistance in determining questions of taxonomy and nomenclature: Dr. B. L. Robinson, Mr. F. V. Coville, Dr. J. N. Rose, Dr. J. K. Small, Dr. P. A. Rydberg, Dr. H. M. Hall, Mr. S. B. Parish, Dr. A. Davidson, Mr. W. F. Wight, Mr. C. R. Ball, Mr. P. L. Ricker, Mrs. K. Brandegee and Miss M. A. Day.

3-11-25
To Professor W. R. Dudley, who has courteously given much time and valuable assistance, and through whose advice and encouragement I undertook the study of the southern California flora, and to Dr. N. L. Britton, who has given valuable aid in carrying on these studies, is due whatever merit this paper may possess.

INTRODUCTION

PHYSIOGRAPHY

Southern California is the name popularly applied to that part of the State of California which lies south of Point Conception and the Tehachapi Mountains, a territory lying between 32° 35' and 35° 45' north latitude, and extending from the 37th to the 43d meridian west. Its western boundary is the Pacific Ocean, its southern Lower California, and its eastern the Colorado River, which separates it from Arizona. On the north the boundary is formed by the cross ranges which break up the general trend of the Coast Ranges and the Sierra Nevada. Its line extends from Point Conception eastward along the Santa Ynez Mountains, Mount Pinos, and the Tehachapi Mountains to the southern extremity of the Sierra Nevada, thence eastward to the southern boundary of Nevada. East of the Sierra Nevada the northern boundary is arbitrary, as the Mohave Desert merges into the desert regions northward and eastward with no definite line of demarcation.

The area comprised within these boundaries is approximately 113,250 square kilometers, a little over one fourth that of the entire State. The greatest width from east to west is 520 kilo-

meters, and from north to south 350 kilometers. Southern California covers an area somewhat greater than the entire State of Pennsylvania. If placed on the northern Atlantic coast it would extend east and west from Boston to Buffalo, and southward as far as Philadelphia.

The topography is broken and irregular, with numerous mountain ranges separated by narrow passes or valleys of greater or less extent. The main axis of these mountains lies generally parallel with the coast at a distance of 40 to 120 kilometers inland. At intervals of 60 to 100 kilometers narrow passes divide this axis into several rather distinct sections. Of these sections the northernmost, which lies between Tejon and Soledad Passes, is composed of a series of comparatively low, chaparral-covered mountains, the culminating peak of which (Liebre Mountain) is only 1737 meters above the sea. South of Soledad Pass, between it and Cajon Pass, are the rugged peaks of the San Gabriel Mountains, which rise abruptly out of the coastal valleys to altitudes ranging from 1800 to over 3000 meters (Mount San Antonio = 3024 meters). The San Bernardino Mountains, although less broken and irregular, reach even higher altitudes. In this range, which is separated by the narrow Cajon Pass from the San Gabriel Mountains, is the highest mountain south of the Sierra Nevada (San Gorgonio, 3428 meters). Extending southeastward from Mount San Gorgonio, at a much lower altitude, are the desert ranges, the Cottonwood and the Chuckawalla Mountains, which separate the Mohave and the Colorado Deserts. To the southward, again, between the Colorado Desert and the coastal region, rise the San Jacinto Mountains. The eastern base of Mount San Jacinto, the highest peak in this range, rests almost directly upon the low depressions of the Colorado Desert (Palm Springs, altitude 137 meters) while its summit, scarcely eight miles distant in an air line, rises with an almost sheer ascent to 3242 meters. South of the San Jacinto Mountains are the less rugged Palomar, Santa Rosa, and Cuicamac Mountains. This series of mountain ranges divides the deserts from the coastal region, and is one of the principal factors which influence the climate of southern California.

The arid desert country east of the mountains, comprising over one half the entire area of southern California, is separated by the Cottonwood and Chuckawalla Mountains into two distinct divisions, the Mohave and the Colorado Deserts.



RELIEF MAP OF CALIFORNIA.





The Mohave Desert, which lies to the north of the dividing ranges, is triangular in outline and covers an area of approximately 51,200 square kilometers. It is chiefly an arid plateau with an elevation of 300 to 900 meters, but north of our limits is the low depression of Death Valley which is nearly 90 meters below sea level. The broad level expanse is broken here and there by short isolated ranges or "lone mountains," the rocky barren slopes of which, save for their talus bases, rise abruptly from the floor-like plain. Between these elevations are numerous low depressions which have become sinks or "dry lakes." The surfaces of these are frequently crusted over with the deposits of soluble salts, and the margins lined with characteristic saline vegetation.

To the south of the Cottonwood and the Chuckawalla Mountains lies the Colorado Desert, which extends southward along the gulf slope of Lower California, and eastward into southern Arizona and northwestern Sonora. Within the boundaries of California this desert, the area of which occupies a little over 16,000 square kilometers, is principally the dry bed of a large inland sea or lake, with pebble-covered beaches that are still clearly discernible along the base of the surrounding mountains. At one time this depression was a continuation of the Gulf of California, from which it was cut off in comparatively recent times. This separation was accomplished partly, perhaps, by a slight elevation of the land between the vicinity of Yuma and the Cocopa Mountains, but chiefly by the delta formed at the mouth of the Colorado River, which latter carries great quantities of silt. Inward from the gravelly rim of the depression the character of the soil gradually changes from a sandy loam into the heaviest of clays, while the center, now covered by an accidental overflow from the Colorado River, is normally a salt bed several feet in thickness.

On the western or coastal side of the mountains the foot-hills and mountains give way here and there to valleys often of considerable extent. These valleys are mainly very fertile, supporting a luxuriant vegetation wherever water is plentiful, but areas of low alkaline soil, or dry gravelly mesas or washes are frequently interspersed. Along the southern base of the San Gabriel and the San Bernardino Mountains the original floor of the valley has been buried by debris of gravel and coarse sands, washed down by the winter torrents from the steep mountain slopes. Here

and there, however, isolated hills or elevated mesas, projecting above the talus, remain as indicators of the original sedimentary deposits. This large interior valley is separated from the low valley along the coast of Los Angeles and Orange Counties by the Santa Ana Mountains, and a series of low hills which connect them with the Santa Monica Mountains. North of this last range is the low coastal valley of Ventura County, the only other valley of any considerable area on the western side of the mountains.

CLIMATOLOGY

GENERAL DESCRIPTION

There is great diversity of climate, due principally to topography, a factor which exerts a marked influence in southern California, since the principal mountain ranges lie transversely to the path of the prevailing winds and storms. As a rule, however, the climate is one of scant precipitation and high temperatures, conditions that become more and more pronounced toward the interior, away from the ameliorating influences of the cool moist sea-breeze. The rainfall is chiefly confined to the winter and early spring months, the dry summer and autumn having almost continual sunshine. Precipitation is greatest in the mountains, with an average annual rainfall in some localities exceeding 100 centimeters, and least in the Colorado Desert, where it is less than 5 centimeters in some sections. Fully as great extremes are found in temperatures. On a winter day, for instance, one may stand among blooming roses or in orange groves laden with ripe fruit, and watch the snow, driven by piercing winds, drifting about the rugged peaks of the neighboring mountains.

The following temperature and rainfall records have been compiled from McAdie's "Climatology of California":

TEMPERATURE AND RAINFALL RECORDS NORMAL MONTHLY AND ANNUAL TEMPERATURE RECORDS, EXPRESSED IN DEGREES FAHRENHEIT

Station.	Altitude in feet	Length of records in years	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual
Anaheim.....	134	23	54.8	56.2	59.2	62.8	66.7	69.8	72.4	73.3	71.9	66.6	61.1	56.9	64.3
Cabazon.....	1779	5	51.0	54.7	56.1	62.2	65.0	75.6	82.9	79.1	75.5	67.5	62.6	54.0	65.7
Claremont.....	1200	9	49.7	51.6	53.0	57.1	60.7	66.7	71.6	70.6	69.2	62.4	57.3	51.6	60.1
Colton.....	965	24	50.6	53.2	57.1	61.4	67.5	73.2	78.5	78.9	73.8	64.8	57.5	53.0	64.0
Elsinore.....	1234	6	50.3	53.0	56.3	61.7	66.0	71.5	78.4	77.1	74.2	65.6	59.2	52.6	63.8
Escondido.....	630	7	49.6	52.0	54.3	58.3	62.6	67.9	72.5	72.1	69.0	61.5	55.1	49.5	60.3
Fernando.....	1066	23	50.5	53.0	56.3	61.1	64.7	70.1	74.7	75.4	72.0	65.0	59.2	54.0	63.0
Indio.....	—20	23	52.9	58.7	65.3	72.5	80.1	88.3	94.5	93.0	86.5	75.4	62.6	56.6	73.7
Manzana.....	2850	7	42.4	44.6	47.5	54.9	61.2	72.3	80.1	78.4	71.2	65.6	51.1	43.4	58.9
Mohave.....	2731	24	45.3	48.8	53.5	59.7	68.0	77.5	85.7	84.2	73.9	65.6	54.8	46.8	64.0
Needles.....	491	24	52.4	57.8	64.8	72.2	80.2	87.8	94.4	92.3	84.7	72.2	60.1	52.8	72.6
Newhall.....	1200	9	47.9	50.2	54.1	58.9	64.1	70.7	76.6	77.3	71.5	62.1	54.8	49.5	61.5
Palm Springs...	584	12	55.3	58.7	65.1	74.6	81.1	90.6	97.7	93.2	85.2	74.5	65.1	55.1	74.7
Poway.....	460	17	48.0	49.5	52.4	55.8	60.6	65.1	68.9	69.6	65.9	59.4	53.5	51.1	58.3
Redlands.....	1335	8	50.8	52.2	54.7	61.1	65.8	73.8	78.3	77.5	72.1	65.0	58.9	53.2	63.5
Riverside.....	1025	19	51.1	52.7	55.9	60.4	65.2	70.6	76.3	76.4	72.1	64.2	58.2	53.4	62.9
Salton.....	—263	12	55.7	58.8	66.0	76.5	83.1	93.8	98.9	97.2	91.0	79.1	66.8	56.1	76.9
San Jacinto.....	1500	8	49.2	51.3	53.5	57.3	64.5	70.2	76.2	76.0	70.6	62.2	56.1	50.0	60.2
Santa Ana.....	137	12	55.5	57.5	60.2	64.2	68.8	72.2	75.0	75.4	73.3	68.4	61.8	57.5	65.8
Santa Barbara...	130	17	53.2	55.8	58.4	62.4	68.2	73.2	78.5	76.9	70.3	62.6	59.1	55.7	59.9
Santa Monica...	92	16	54.2	54.6	57.8	61.3	64.4	66.9	69.9	70.3	67.8	64.8	60.2	57.0	62.5
Santa Paula.....	286	12	52.4	54.0	55.8	60.5	63.4	65.6	68.5	68.4	66.3	62.5	59.8	55.6	61.1
Tehachapi.....	3964	24	38.2	39.3	44.1	50.2	59.2	69.4	76.4	74.5	66.1	56.1	46.5	39.5	54.9
Ventura.....	59	8	52.8	53.2	53.6	56.0	58.6	62.1	63.5	64.6	61.4	60.1	57.2	54.9	58.2

MEAN MONTHLY AND ANNUAL RAINFALL RECORDS, EXPRESSED IN INCHES

Station.	Altitude in feet	Length of records in years	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual
Anaheim.....	134	23	2.15	2.18	2.24	.71	.36	.08	T	1.86	.06	.49	.94	2.32	11.53
Campo	2543	18	2.42	4.74	2.37	1.90	.96	.15	.53	1.86	.25	.46	1.57	2.59	19.80
Colton.....	965	24	1.83	1.97	1.91	.95	.52	.07	.03	.02	.05	.43	.93	1.74	10.47
Cuamaca.....	4800	4	4.98	4.43	5.33	1.45	1.88	.36	.37	.31	.54	2.25	3.87	4.21	29.98
Descanso.....	3500	5	4.24	3.45	3.79	1.21	1.40	.01	.20	.05	.17	1.48	1.28	1.28	19.55
Fallbrook.....	700	25	3.50	3.33	2.98	1.28	.64	.12	.02	.05	.11	.74	1.49	3.06	17.30
Fernando.....	1066	23	2.49	2.55	2.69	1.05	.44	.12	.02	.04	.04	.73	1.31	2.69	14.19
Holcomb Creek	5220	5	3.68	1.85	2.79	.60	.60	.05	.00	.28	.10	1.26	1.13	.90	13.24
Indio.....	-20	23	.87	.35	.20	.04	.03	T	T	.14	.11	.08	.19	.41	2.43
Little Bear Valley	5150	7	5.08	2.97	5.38	1.17	1.86	.08	.01	.10	.44	1.36	1.33	5.57	23.35
Los Angeles.....	294	24	2.80	2.82	2.72	1.10	.51	.10	.02	.04	.04	.81	1.47	3.28	15.71
Mammoth Tank.....	257	23	.17	.35	.19	.06	.02	T	.06	.23	.05	.12	.14	.40	1.81
Manzana	2870	7	1.54	.50	1.13	.17	.15	.03	T	.21	.08	.37	.58	.88	5.65
Mohave	2751	24	.90	.84	.71	.16	.04	.05	.08	.04	.07	.25	.30	1.26	4.79
Morse's House.....	5350	7	7.77	5.57	8.22	2.26	3.34	.25	.02	.30	.33	2.03	1.93	8.41	40.43
Mount Lowe.....	3300	8	3.53	2.45	3.74	1.17	1.86	.18	.03	.02	.10	1.90	3.40	.83	19.21
Mutau Flat	4850	9	4.59	1.30	2.17	.77	.59	.00	.08	.00	.25	1.28	1.12	2.01	14.16
Needles.....	477	9	.61	.16	.21	.04	.11	.02	.42	.22	.11	.10	.24	.55	2.79
Newhall	1200	24	2.54	2.88	2.81	1.03	.51	.08	T	.03	.06	.72	1.56	3.40	15.62
Ogilby.....	354	11	.21	.26	.14	.00	.05	.00	.09	.05	.10	.01	.04	.15	1.10
Palm Springs.....	584	12	.74	.66	.35	T	.02	.00	.03	.19	.05	.15	.29	1.20	3.53
Pasadena	828	8	3.65	1.36	3.14	.27	.54	.09	T	.01	.11	.98	1.88	2.09	13.83
Pomona	860	7	3.61	1.32	2.33	.29	.65	.10	.01	.00	.09	.74	1.80	1.88	12.83
Poway.....	460	17	3.11	2.02	2.40	1.37	.54	.09	.01	.02	.05	.54	1.16	1.99	13.29
Redlands	1352	12	2.59	2.67	2.63	.55	.76	.10	.04	.52	.37	.68	.94	2.86	14.70
Salton.....	-263	12	.43	.62	.21	T	.07	.19	.14	.13	.12	.12	.55	.55	2.56
San Bernardino ..	1048	29	3.32	2.95	2.53	1.22	.58	.08	.03	.19	1.12	.60	1.29	2.99	15.59
San Diego.....	100	52	1.75	1.91	1.37	.64	.34	.07	.05	.11	.07	.33	.96	1.97	9.52
Santa Ana	137	12	2.34	2.09	2.24	.32	.37	.05	.00	.06	.07	.74	.74	2.45	11.46
Santa Barbara.....	130	33	3.68	3.12	2.26	1.18	.40	.11	.02	.04	.22	.77	1.61	3.51	16.59
Santa Paula.....	286	12	3.06	2.07	3.07	.37	.44	.05	.01	.01	.27	1.06	.86	3.51	14.77
Tehachapi	3964	24	1.39	2.49	1.63	1.30	.40	.10	.01	.11	.09	.45	.56	1.96	10.47
Ventura	50	9	3.18	1.64	2.38	.40	.38	.08	.04	T	.28	.67	1.18	1.88	12.11
Volcano Springs ..	-220	12	.26	.32	.11	T	T	.00	.11	.09	.01	.17	.08	.43	1.59
Whittier	239	12	2.55	1.79	2.48	.24	.66	.06	.00	.08	.02	.89	1.33	1.56	11.65

CHART OF THE ANNUAL RAINFALL RECORDS, CLASSIFIED ACCORDING TO THE PHYTOGEOGRAPHIC SECTIONS

(Each column represents one eighth the actual rainfall)

Deserts, altitude — 87 to 917 meters, Lower Austral Zone; rainfall 64.2 cm.

Mountains, altitude 1600 to 1780 meters, Transition Zone; rainfall 798 cm.

Foothills, altitude 847 to 1321 meters, Upper Austral Zone; rainfall 488.7 cm.

Interior valleys, altitude 400 to 454 meters, Lower Austral Zone; rainfall 324 cm.

Coastal valleys, altitude 10 to 279 meters, Upper Austral Zone; rainfall 340.5 cm.

San Diego district, altitude 10 to 100 meters, Lower Austral Zone; rainfall 238 cm.

PHYTOGEOGRAPHIC FEATURES

GENERAL DESCRIPTION

Phytogeographically southern California is separated into three clearly defined floral divisions—the coastal slope, the mountain, and the desert. Each of these divisions has derived its characteristic plants from different floral elements. The species of the coastal slope are principally of Californian origin; the species confined to the mountains, boreal or of boreal ancestry; and those of the deserts, endemic or migrants from the Great Basin, Sonora, or Lower California. To discuss these different floras intelligently it is essential that some general system be followed. Engler's¹ arrangement has many commendable features, but Merriam's² system of North American life zones has been more completely worked out for this country and is therefore adopted.

An outline of Merriam's life zones for North America north of the tropics is as follows:

Region	Zone	Area
Boreal.....	{ Arctic-alpine Hudsonian Canadian	

¹Engler, A. Syllabus der Pflanzenfamilien, 213-222. 1907.

²Merriam, C. H. Life Zones and Crop Zones of the United States. Bull. U. S. Biol. Survey, No. 10. 1898.

Austral.....	{	Transition.....	{ Atlantic Humid
			{ Western Arid
	{	Upper Austral.....	{ Pacific Humid
			{ Upper Carolinian
	{	Lower Austral.....	{ Upper Sonoran
			{ Lower Carolinian
			{ Louisianian
			{ Lower Sonoran

BOREAL REGION

GENERAL DESCRIPTION

In southern California the Boreal Region occupies the uppermost altitudes of the prominent mountain peaks, seldom descending lower than 2550 meters. It is therefore comparatively restricted, appearing only on the following peaks: Pinos, North Baldy, Pine, San Antonio, Sugarloaf, San Bernardino, San Gorgonio, San Jacinto, and Santa Rosa. The region is most extensive in the vicinity of Mount San Gorgonio and Mount San Bernardino, where it covers the high ridges connecting the peaks and the spurs leading from them.

The three zones of the Boreal Region are less clearly defined than in more northerly territories, chiefly because the area covered by it is so limited. The presence of the Arctic-alpine Zone was first noted by Hall³, who discovered three characteristic Alpine species, *Carex Preslii*, *Oxyria digyna*, and *Ranunculus Eschscholtzii* on steep north slopes of Mount San Jacinto near perpetual snow. To this scanty list Parish⁴ has added *Arenaria hirta verna* and *Antennaria alpina* from Mount San Gorgonio. The presence even of this small number of truly Arctic-alpine species is of considerable interest, for, as pointed out by Hall and Parish, they mark "the most southern known limit of the Arctic flora on the North American Continent."

CANADIAN ZONE

The two lower zones, the Hudsonian and the Canadian, are inseparable in southern California. Parish suggests that *Pinus Murrayana* characterizes the Canadian, and *Pinus flexilis* the

³Hall, H. M. A botanical Survey of San Jacinto Mountain. Univ. Calif. Publ., Bot. 1: 16. 1902.

⁴Parish, S. B. Sketch of the Flora of southern California. Bot. Gaz. 36: 203-222 and 259-279. 1903.



PINUS MURRAYANA AND P. FLEXILIS. DRY LAKE, SAN BERNARDINO MOUNTAINS.

Hudsonian, but such a distinction is not tenable, for on Mount San Gorgonio, where the Boreal Region is best developed, both species intermingle from the neighborhood of Dry Lake (altitude 2775 meters) to the very summit. Ascending the mountain from Dry Lake one passes through pure forests of these two pines. Even the floor, which is composed of loose broken granitic rock, is almost bare of vegetation. Continuing upward the trees become fewer and more reduced in stature until it is difficult to walk beneath their gnarled branches. Finally, as the summit is approached, they become prostrate shrubs with such stiff compact branches that one may tramp over them with little difficulty. On the summit of Mount Pinos, where *Pinus Murrayana* has not been recorded, *Pinus flexilis* is found intermingling with *Abies concolor* and other upper Transition species. In fact it is impossible to detect two distinct belts of these two pines on any of the mountains. Notwithstanding the fact, therefore, that there are traces of Arctic-alpine plants, the only logical treatment demands that all the Boreal Region of southern California be placed in the Canadian Zone.

In addition to the localities mentioned there is a fringe of the Canadian Zone on the western borders of Bear Valley, and Bluff Lake. *Pinus Murrayana* grows rather abundantly here, the lowest altitude (2010 meters) reached by this species in southern California.

The characteristic trees and shrubs are:

<i>Pinus flexilis</i>	<i>Ribes montigenum</i>
<i>Pinus Murrayana</i>	<i>Sericotheca concolor</i>
<i>Populus tremuloides</i>	<i>Phyllodoce Breweri</i>
<i>Salix glaucops</i>	

Sericotheca concolor and *Phyllodoce Breweri* extend northward through the Sierra Nevada to the southern Cascade Mountains, and to the mountains of western Nevada. All the remaining species extend to the Rocky Mountains, and one, *Populus tremuloides*, to the northern Atlantic. The geographical distribution of these species demonstrates the intimate relation the flora of this zone bears to that of the more northern parts of North America.

The origin of a boreal flora on these isolated southern mountain peaks is traceable to the influence of the Glacial Period. During that period central and southern California possessed a climate similar to that found to-day in the Puget Sound region. Perpet-

ual snow and glaciation extended down the mountain slopes to approximately 1800 meters altitude. The Canadian Zone, therefore, probably was as low as 900 meters or even lower, forming an unbroken belt, with the possible exception of San Gorgonio Pass, from the Sierra Nevada to San Pedro Martir Mountain. The receding of the ice and the consequent northern and upward migration of the plants left these isolated remnants stranded on the higher peaks.

From the standpoint of regional distribution it is significant that only one species, *Populus tremuloides*, extends east of the Rocky Mountains. It argues that an eastern and western area should be recognized.

AUSTRAL REGION

GENERAL DESCRIPTION

The Austral Region occupies nearly the entire area of southern California, in the midst of which, on the tips of the highest mountain peaks, are situated the small isolated areas of typical Boreal. The three zones of the region are distinctly defined over large areas, but on account of great local variations in climatological conditions, due to slope exposure, sea-breezes, desert winds or other influences, isolated patches of a zone may be found far beyond its normal range.

TRANSITION ZONE

The Transition Zone, which is best characterized by the yellow pine (*Pinus ponderosa*), includes the principal forested area of the mountains. Its average range of altitude is from 1500 to 2700 meters, but deviations from this, chiefly due to slope exposure, are often considerable.

The forests are principally coniferous with a few scattered oaks, and along streams, poplars, willows, alders and maples. They are usually open and park-like, with a sparsely grass-covered floor, or with growths of low underbrush, which in rocky exposed places often develop into chaparral.

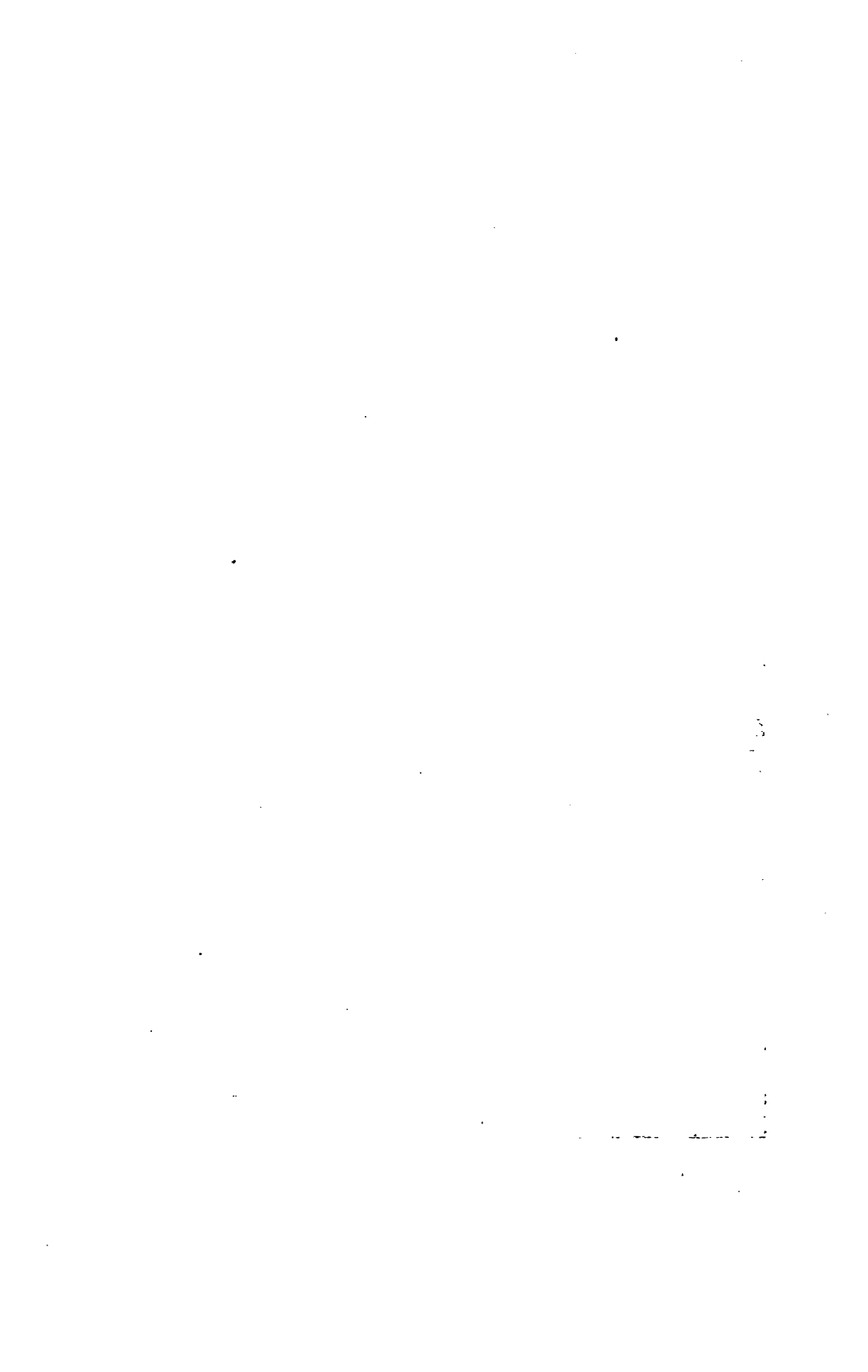
Approximately 50 species of trees and shrubs have been recorded within the Transition Zone, of which the following are characteristic:

Pinus Lambertiana
Pinus ponderosa

Ceanothus integerrimus puberulus
Ceanothus Palmeri



• JUNIPERUS OCCIDENTALIS. BEAR VALLEY, SAN BERNARDINO MOUNTAINS.





PINUS PONDEROSA JEFFREYI. MOUNT PINOS.



<i>Pinus ponderosa</i> Jeffreyi	<i>Cornus Nuttallii</i>
<i>Pinus Coulteri</i>	<i>Azalea occidentale</i>
<i>Abies concolor</i>	<i>Uva-ursi</i> Parryana
<i>Heyderia decurrens</i>	* <i>Uva-ursi</i> patula
* <i>Juniperus occidentalis</i>	<i>Uva-ursi</i> Pringlei
* <i>Salix Scouleriana</i>	* <i>Leptodactylon Hookeri</i>
<i>Quercus Kelloggii</i>	<i>Eriodictyon Parryi</i>
* <i>Castanopsis sempervirens</i>	<i>Ramona pachystachya</i>
<i>Ribes nevadensis</i>	<i>Pentstemon jacinthus</i>
<i>Rubus leucodermis</i>	<i>Sambucus mexicana</i>
<i>Rubacarpus velutinus</i>	* <i>Symphoricarpos Parishii</i>
<i>Cercocarpus ledifolius</i>	<i>Chrysothamnus stenophyllus</i>
<i>Cercis occidentalis</i>	<i>Artemesia tridentata</i>
* <i>Ceanothus cordulatus</i>	<i>Tetradymia canescens</i>

The species designated by an asterisk (*) are confined to the upper parts of the Transition and extend into the Canadian Zone.

A study of the geographical distribution of the species found in the Transition Zone shows that about sixty per cent. are limited to California (including San Pedro Martir Mountain) or extend only into the southern part of the Cascade Mountains; fifteen per cent. extend northward along the Coast or the Cascade Mountains of Oregon and Washington; ten per cent. are common to California and the Great Basin, and twelve per cent. occur throughout the Western Arid Area.

To express the phytogeographical conditions of this zone accurately it is evident that the divisions must reckon with the large percentage of purely Californian or endemic species. The simple statement that the flora belongs to the Transition Zone, as is usually the case, or that it is in the Western Arid Area, is misleading, as many of the species are not found in other parts of these divisions. It is essential that the areas recognized by Merriam, and based upon moisture, be divided into sub-areas, which are chiefly the result of a third factor—geographical segregation.

Without undertaking a discussion of the entire Western Arid Area, the California mountains, on account of the large number of endemic genera and species, are recognized as a distinct division of the area. This may be termed the Sierran Sub-area.

The Sierran Sub-area is best characterized by *Pinus ponderosa* Jeffreyi, *Pinus Lambertiana* and *Heyderia decurrens*. Its geographical limits on the north are most satisfactorily defined by

the Klamath Gap. South of this gap the Sub-area occupies the Transition Zone of the Sierra Nevada and the inner Coast Ranges of central California, and extends through the mountains of southern California to Mount San Pedro Martir.

In the Sierra Nevada the Transition Zone is fairly continuous, extending almost unbroken from the north Coast Ranges around the head of the Sacramento Valley, and southward along the western slopes of the Sierra Nevada. The southern inner Coast Ranges and the mountains of southern California, on the other hand, are composed of isolated ranges. Hence great gaps occur in the Transition Zone of these ranges, which form barriers to the migration of species. Each of these sections is usually represented by several peculiar species, while others are conspicuous by their absence. The Sierran Sub-area separates, therefore, into three natural divisions, the Sierra Nevada District, the South Coast Range District, and the San Bernardino District. The latter includes the Transition Zone of the San Gabriel and San Bernardino ranges, and the mountains southward to San Pedro Martir. In this district there are several endemic species, such as *Acer bernardinum*, *Ceanothus integerrimus puberulus*, and *Ceanothus Palmeri*, while many of the species common in the northern districts are absent.

UPPER AUSTRAL ZONE

General description.—The Upper Austral Zone in southern California is represented wholly by the Upper Sonoran Area, which includes two distinct sections, the coastal slope and the piñon and juniper belts of the desert slopes of the mountains. The characteristic plants of these two sections represent two different floral elements. The coastal slope species are predominantly Californian, while many of those on the desert slopes belong to the Great Basin element.

Coastal slope.—The coastal slope of southern California is separated from the more northern parts of the Californian Sub-area⁵ along the seaboard by Point Conception. The coast to

⁵The California Sub-area, which is equivalent to Engler's "Innerkalifornische" zone of the "Westamerikanische Wüsten- und Steppenprovinz," is that part of the Upper Sonoran Area which lies west of the Sierra Nevada divide, and extends from southern Oregon to northern Lower California. The name "intramontane" has been applied to this region, but it is best to restrict that term to the floral district of the sub-area which lies between the Sierra Nevada and the Coast Ranges of central and northern California. "Cismontane" as used by Parish (*l. c.*) includes parts of two zones, which seems illogical.



PSEUDOTSUGA MACROCARPA AND CHAPARRAL. TOPATOPA MOUNTAINS.

the southward of this promontory turns directly eastward for 125 kilometers or more, paralleling the cross ranges which lie only a few miles distant. The coastal country is therefore protected from the northwest coast winds, and its warm southern slopes form a striking contrast to the cold bleak wind-swept mesas and hills about the promontory. A natural barrier is thus formed where a large number of species meet their southern or northern limits.

South of Point Conception the entire coastal slope below the Transition Zone belongs to the Upper Sonoran, except the interior valleys and the southwestern part of San Diego County which are Lower Sonoran.

Within this area, which we shall term the Southern California District, are over 100 species of trees and shrubs. A study of the geographical distribution of these species shows that only four extend eastward as far as the Rocky Mountains, less than ten per cent. north to the Columbia River, and about the same number east to the Great Basin and Arizona. Nearly all the remaining species, or fully two thirds of the entire number are confined to the California Sub-area, and of these about forty are chiefly confined to the Southern California District.

The most characteristic species of the Southern California District is *Pseudotsuga macrocarpa*. The geographical limits of this conifer almost coincide with those of the district. It does not extend northward beyond the Santa Ynez Mountains, nor beyond Fort Tejon in the mountains connecting with the Sierra Nevada. It is confined, however, to the upper altitudes, extending even into the Transition Zone.

The following trees and shrubs are characteristic of the Southern California District, being almost or wholly confined within its boundaries:

<i>Pseudotsuga macrocarpa</i>	* <i>Ceanothus Orcuttii</i>
<i>Juglans californica</i>	<i>Ceanothus megacarpus</i>
<i>Eriogonum cinereum</i>	<i>Ceanothus crassifolius</i>
<i>Eriogonum fasciculatum folio-</i>	<i>Vitis Girdiana</i>
<i>losum</i>	<i>Malacothamnus fasciculatus</i>
<i>Atriplex Breweri</i>	<i>Malacothamnus Nuttallii</i>
* <i>Clematis pauciflora</i>	<i>Styrax californica flavescens</i>
<i>Odostemon Nevinii</i>	<i>Leptodactylon californicum glan-</i>
<i>Ribes indecorum</i>	<i>dulosum</i>
<i>Grossularia amara</i>	* <i>Eriodictyon crassifolium</i>

<i>Grossularia hesperia</i>	<i>Trichostema Parishii</i>
<i>Grossularia Parishii</i>	<i>Sphacele fragrans</i>
* <i>Adenostoma sparsifolium</i>	* <i>Diplacus longiflorus</i>
<i>Rosa Aldersonii</i>	<i>Diplacus puniceus</i>
* <i>Xylothermia montana tomentosa</i>	<i>Pentstemon cordifolius</i>
<i>Lupinus longifolius</i>	* <i>Penstemon ternatus</i>
<i>Lupinus Hallii</i>	<i>Penstemon antirrhinoides</i>
<i>Rhamnus pilosa</i>	<i>Lonicera subspicata denudata</i>
<i>Ceanothus spinosus</i>	<i>Ericameria cuneata spathulata</i>
<i>Ceanothus divaricatus eglandulosus</i>	<i>Ericameria Parishii</i>
<i>Ceanothus oliganthus</i>	<i>Baccharis Plummerae</i>

The species designated by an asterisk (*) are restricted to the southern part of the district.

The general character of the vegetation is typical of a warm temperate climate which possesses moist cool winters and hot dry summers. The predominant plants are evergreen xerophyllous shrubs with small thick leathery leaves of a dull or grayish-green color. They are invariably stiff compact growers, forming impenetrable thickets that spread over the mountainsides in almost unbroken masses for many miles.

The diversity of the flora, however, is considerable. The proximity of the sea and the irregularities of the topography, together with the resultant climatic conditions, are factors that have aided in the development of several sub-districts with distinctive floral features. Three of these floral sub-districts are recognized: the Littoral, the Coastal, and the Interior. The first of these sub-districts is the territory the within immediate influence of the sea, the second comprises the fog belt, and the third the chaparral belt of the interior mountains and foothills which are more or less cut off from the direct influence of the sea-breeze by hills or low mountains. Where passes or other connections exist between the Interior and the Coastal Sub-district the floral changes are gradual and difficult to separate.

The Littoral Sub-district is confined to the immediate proximity of the sea, and is composed of four formations: the beach, the sand-dune, the salt-marsh, and the bluff. The number of shrubby plants wholly limited to this sub-district is small, *Eriogonum parvifolium*, *Lupinus Chamissonis*, and *Ericameria ericoides* on the sand-dunes, and *Atriplex Breweri* on the bluffs and edges of

salt-marshes being the complete list.⁶ Of these strictly maritime species, *Eriogonum parvifolium* extends northward to Monterey, and *Atriplex Breweri* to Santa Barbara. The other species are also confined to the California coast, but extend farther northward into northern California.

The Coastal Sub-district comprises the valleys and rolling hills along the coast, and the coast slope of the foothills and mountains which separate them from the interior valleys. Its inland boundary extends along the southern slope of the Santa Ynez Mountains, the coast slope of the mountains of Ventura County, and southward through the San Fernando and Santa Monica Mountains to the Santa Ana Mountains, thence along the western slope of the Palomar Mountains where it blends with the Interior Sub-district.

The principal plant formations of this area are the mesa and rolling hills, the alluvial, the oak-grove, the canyon, and the chaparral. The mesas and rolling grassy hills are characterized chiefly by the absence of woody plants rather than by any peculiar species. Along the inner boundary of this formation and merging with the Interior Sub-district are park-like groves of oaks. North of the Santa Monica Mountains, along their northern base, and in the Simi, Newhall and Ojai Valleys handsome trees of *Quercus lobata* abound. This species does not extend south of the Santa Monica Mountains, but its place south of this range is taken by *Quercus Engelmannii* which, together with *Quercus agrifolia*, covers considerable area about Pasadena, Santa Anita, and Fallbrook.

The following trees and shrubs are mostly confined to the Coastal Sub-district:

<i>Myrica californica</i>	<i>Malacothamnus Nuttallii</i>
<i>Juglans californica</i>	<i>Ceanothus spinosus</i>
<i>Quercus lobata</i>	<i>Ceanothus sorediatus</i>
<i>Quercus Engelmannii</i>	<i>Ceanothus oliganthus</i>
<i>Grossularia speciosa</i>	<i>Ceanothus megacarpus</i>
<i>Grossularia amara</i>	<i>Arbutus Menziesii</i>
<i>Sericotheca franciscana</i>	<i>Trichostema lanatum</i>
<i>Lupinus longifolius</i>	<i>Ramona niveum</i>

⁶In addition to these true shrubs there are a number of suffrutescent perennials that are also confined to this sub-district. Among these may be mentioned *Cheiranthus suffrutescens*, *Sphaerostigma viridescens*, *Batis maritima*, and *Salicornia ambigua*.

Polygala californica
Acer californicum
Lithraea laurina

Lonicera Ledebourii
Baccharis pilularis
Baccharis Plummerae

A large percentage of these species, which are chiefly confined to the northern part of the sub-district, are common in northern California. They simply reach their southern limit within this sub-district. In this connection the influence of the Santa Monica Mountains should not be passed by unnoticed. This cross range, although seldom reaching a higher altitude than 750 meters, exerts a marked influence on the northern and southern distribution of plants along the coast. The two oaks, *Quercus lobata* and *Quercus Engelmannii*, are notable examples of species that are checked by this range in their northerly or southerly distribution. Several northern shrubs, such as *Myrica californica* and *Baccharis pilularis*, do not occur south of this range.

The Interior Sub-district occupies the foothills and the typical chaparral of the interior mountains which are shut off from the direct influence of the sea-breeze by hills or low mountains. The western boundary is outlined by the Coastal Sub-district, and its inland by the Transition Zone of the higher mountains, or by the deserts in the lower mountains and passes. This sub-district extends from the Liebre Mountains southeastward along the coastal slope of the San Gabriel, the San Bernardino, the San Jacinto, and the Cuernavaca mountains.

The chaparral, of which the sub-district is almost wholly composed, is separated into several altitudinal belts. These altitudinal floral changes are very evident to one ascending any of the mountain trails. Along the base of the mountains, sometimes extending up their slopes several hundred feet and out over the footslopes, is a belt intermediate between the Upper and Lower Sonoran. Here the prevailing plants are *Ramona stachiodoides*, *Eriogonum fasciculatum foliolosum* and *Senecio Douglasii*. Ascending the steep mountain slopes one passes into the typical chaparral. *Adenostoma fasciculatum* prevails through the lower altitudes in the eastern part of the San Gabriel Mountains, and in the San Bernardino and the San Jacinto Mountains, but on the Mount Wilson trail, which is intermediate between the Coastal and the Interior Sub-districts, *Quercus dumosa* and *Ceanothus crassifolius* are the predominating species. Further up the slopes these species gradually give way to others, of which *Ceanothus divaricatus*





ALNUS RHOMBIFOLIA. WATERMAN CANYON, SAN BERNARDINO MOUNTAINS.



eglandulosus, *Uva-ursi tomentosa*, and, in the San Bernardino Mountains, *Uva-ursi pungens*, are perhaps the most characteristic. *Pseudotsuga macrocarpa* grows with these species, especially on the north slopes. This tree becomes more abundant at higher altitudes and extends into the lower part of the Transition Zone.

In the canyons, *Quercus chrysolepis*, *Acer macrophyllum* and *Umbellularia californica* seldom descend lower than 750 meters; but *Alnus rhombifolia* often follows living streams into the edges of the valleys. *Platanus racemosa* is mostly confined to the lower altitudes, and occurs on the canyon floors, often following the washes well out into the valleys.

The following trees and shrubs are mainly restricted to the Interior Sub-district:

<i>Pseudotsuga macrocarpa</i>	<i>Ceanothus crassifolius</i>
<i>Ribes indecorum</i>	<i>Uva-ursi pungens</i>
<i>Adenostoma sparsifolium</i>	<i>Trichostema Parishii</i>
<i>Xylothermia montana tomentosa</i>	<i>Pentstemon ternatus</i>
<i>Lupinus Hallii</i>	<i>Pentstemon antirrhinoides</i>
<i>Ceanothus divaricatus eglandulosus</i>	<i>Ericameria Parishii</i>

Desert slopes.—The Upper Sonoran Area on the desert slopes of the mountains is commonly called the piñon and juniper belts, the two conifers, *Pinus monophylla* and *Juniperus californica* being the most characteristic species. The piñon occurs in the upper altitudes of the zone (1200-1800 meters). The juniper, on the other hand, occupies the lower altitudes (900-1200 meters), and along the lower edges of the belt mingles with the yuccas and other shrubs characteristic of the Lower Sonoran.⁷ In the Providence Mountains *Juniperus utahensis* replaces *Juniperus californica*. This is the only locality where this species enters into our territory, but in the Panamint Mountains it also replaces *Juniperus californica*, and extends from there eastward over southern Nevada and Utah. Each of these species may be considered as representing a distinct floral district.

Several trees and shrubs which belong properly to the Intra-montane district penetrate through Tejon Pass and extend in a

⁷The juniper belt is retained in the Upper Sonoran with reluctance, for over a large part of the belt the associating species are predominantly Lower Sonoran. On the coastal slope if we found the juniper at all we should expect it in the Upper Sonoran, if it actually belongs in that zone, but instead it occurs only in the Lower Sonoran of the interior valleys.

narrow belt along the western slope of Antelope Valley. The normal flora of the desert slopes is modified in this section by the presence of such species as *Pinus Sabiniana*, *Quercus Douglasii*, *Grossularia quercetorum* and *Aesculus californica*.

Along the Mexican Boundary a number of Peninsular species enter the flora in the piñon belt. Of these *Pinus quadrifolia* is the most noteworthy. This nut pine, which almost entirely replaces *Pinus monophylla* a few miles below the international boundary, occurs sparingly as far north as the Santa Rosa Mountains.

The following are the characteristic Upper Sonoran trees and shrubs of the desert slopes:

* <i>Pinus monophylla</i>	<i>Isomeris arborea globosa</i>
* <i>Pinus quadrifolia</i>	* <i>Kunzia glandulosa</i>
<i>Juniperus californica</i>	* <i>Rhamnus cuspidata</i>
<i>Juniperus utahensis</i>	* <i>Ceanothus vestitus</i>
<i>Ephedra viridis</i>	<i>Malacothamnus Fremontii</i>
* <i>Quercus Alfordiana</i>	* <i>Fremontodendron californicum</i>
* <i>Quercus Dunnii</i>	<i>Fraxinus velutinus</i>
* <i>Quercus turbinella</i>	<i>Fraxinus anomala</i>
<i>Eriogonum fasciculatum polifolium</i>	<i>Diplacus aridis</i>
* <i>Eriogonum Heermanii</i>	<i>Stenotopsis interior</i>
* <i>Odostemon Fremontii</i>	

The species designated by an asterisk (*) are confined to the upper or piñon belt.

. LOWER AUSTRAL ZONE

General description.—The Lower Austral Zone in southern California is represented by the Lower Sonoran Area. It includes all of the desert regions below the juniper belt, and protrudes through the lower passes into the hot interior valleys of the coastal slope. It also extends northward along the coast of Lower California to the vicinity of San Diego.

Three floral elements enter into the composition of the Lower Sonoran in southern California, the Great Basin, the Sonoran, and the Peninsular. In the Mohave Desert many of the characteristic species are of the Great Basin element, in the Colorado Desert the Sonoran and the Peninsular species predominate, and at San Diego the Peninsular. Unfortunately the Lower Sonoran Area has not been sufficiently explored to warrant its division into sub-areas. Each of the southern California sections



PINUS SABINIANA. OAKGROVE CANYON, LIEBRE MOUNTAINS.





LOOKING NORTHEAST ACROSS SAN BERNARDINO VALLEY.

of the zone will be discussed, therefore, without an attempt to assign them to definite floral districts.

Interior valleys.—In the San Fernando, the San Bernardino, and the San Jacinto Valleys, the fan-like footslopes that spread over the valleys from the bases of the steep mountain slopes, and the dry washes leading from the mouths of the canyons give rise on their semi-arid gravelly slopes to a low shrubby type of vegetation resembling that of the desert in its xerophytic habit. The upper parts of the footslopes, as has been previously stated, are intermediate between the Upper and the Lower Sonoran, but the dry washes produce a typical Lower Sonoran flora, that often spreads over the greater part of the footslopes.

Following is a list of characteristic Lower Sonoran trees and shrubs of the interior valleys:

<i>Salix vaillicola</i>	<i>Gutierrezia divergens</i>
<i>Populus Fremontii</i>	<i>Ericameria pinifolia</i>
* <i>Strombicarpus pubescens</i>	* <i>Encelia farinosa</i>
* <i>Prosopis glandulosa</i>	<i>Viguiera Parishii</i>
<i>Opuntia bernardina</i>	<i>Bebbia juncea</i>
<i>Opuntia Covillei</i>	<i>Lepidospartum squamatum</i>
* <i>Chilopsis linearis</i>	<i>Tetradymia comosa</i>

The species designated by an asterisk (*) occur only in the eastern end of the San Bernardino Valley or in the San Jacinto Valley, and of these only *Encelia farinosa* is common.

San Diego district.—A large number of peninsular species of shrubs and herbaceous plants extend into southwestern San Diego County which give a floral aspect quite unlike that of other parts of the coastal slope.

The following is a list of peninsular or desert species recorded from the vicinity of San Diego:

<i>Ephedra californica</i>	<i>Opuntia prolifera</i>
<i>Yucca mohavensis</i>	<i>Opuntia californica</i>
<i>Atriplex canescens</i>	<i>Lycium Richii</i>
<i>Isomeris arborea</i>	<i>Lycium Andersonii Wrightii</i>
<i>Prosopis velutina</i>	<i>Lycium californicum</i>
<i>Cnecoridium dumosum</i>	<i>Hymenoclea monogyra</i>
<i>Acalypha californica</i>	<i>Gaertneria chenopodifolia</i>
<i>Trichostigma miserum</i>	<i>Iva Hindsiana</i>
<i>Simmondsia californica</i>	<i>Viguiera laciniata</i>
<i>Adolphia californica</i>	

In addition to the typical Lower Sonoran species there are a number of other shrubby species peculiar to the San Diego region which are often the principal components of the chaparral. These species are: *Cercocarpus minutiflora*, *Adenostoma fasciculatum obtusifolium*, *Ceanothus verrucosus*, *Xylococcus bicolor*, and *Comarostaphylis diversifolia*. *Pinus Torreyana* is also restricted to this, with the exception of a small grove on Santa Rosa Island.

Mohave Desert.—The Lower Sonoran Area occupies nearly the entire area of the Mohave Desert, only in the upper altitudes of the mountains is it replaced by the juniper and piñon belts of the Upper Sonoran. Wherever the soil conditions are favorable *Covillea tridentata* predominates. This shrub, commonly known as the "creosote bush," is the most characteristic species of the entire Lower Sonoran Area, at least in the arid parts; but, on account of its wide range and its association in the various regions with markedly different floral elements, it cannot be utilized in segregating phytogeographical districts.

Along the upper edges of the *Covillea* belt, and often extending into the edges of the juniper belt, are a number of characteristic desert shrubs, such as *Grayia spinosa*, *Tetradymia spinosa*, *Tetradymia stenolepis*, *Amygdalus Fremontii* and *Adelia neo-mexicana*. Associated with these is the tree yucca (*Cleistoyucca arborescens*), locally known as the "Joshua tree." The great stretches of this desert yucca that spread over the gradually sloping plains resemble immense orchard tracts, and form a prominent feature of the landscape.

The following Lower Sonoran trees and shrubs have been recorded in the Mohave Desert within the limits of our territory:

- | | |
|---------------------------------|------------------------------------|
| * <i>Ephedra nevadensis</i> | * <i>Echinocactus Lecontei</i> |
| * <i>Ephedra californica</i> | * <i>Echinocactus polycephalus</i> |
| * <i>Yucca mohavensis</i> | <i>Menodora spinescens</i> |
| <i>Cleistoyucca arborescens</i> | <i>Adelia neo-mexicana</i> |
| * <i>Populus Fremontii</i> | <i>Ramona pilosa</i> |
| * <i>Salix vallicola</i> | <i>Ramona capitata</i> |
| * <i>Salix argophylla</i> | * <i>Lycium Cooperi</i> |
| <i>Eriogonum Plumatella</i> | <i>Lycium Andersonii</i> |
| * <i>Atriplex lentiformis</i> | <i>Salazaria mexicana</i> |
| * <i>Atriplex polycarpa</i> | * <i>Chilopsis linearis</i> |
| * <i>Atriplex confertifolia</i> | * <i>Hymenoclea Salsola</i> |
| <i>Atriplex Parryi</i> | <i>Gaertneria eriocentra</i> |



CLEISTOYUCCA ARBORESCENS. MOHAVE DESERT.

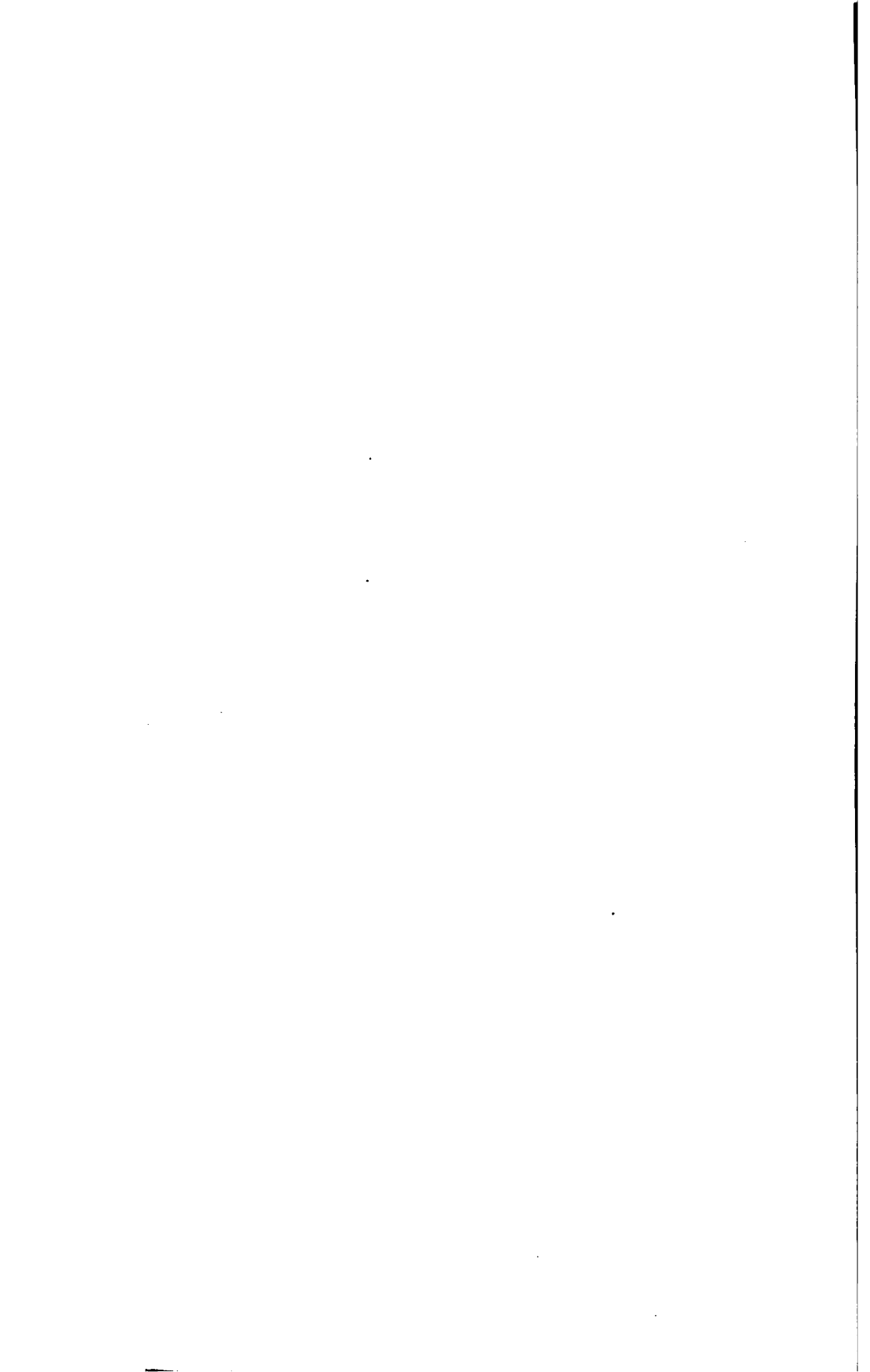




FIG. 1.
COVILLEA TRIDENTATA. NEAR WILLOW SPRINGS.



FIG. 2.
OLNEYA TESOTA. SIGNAL MOUNTAIN.



- **Atriplex hymenelytra*
- **Atriplex canescens*
Atriplex Torreyi
Grayia spinosa
- **Eurotia lanata*
- **Allenrolfia occidentalis*
Sarcobatus vermiculatus
Lepidium Fremontii
- **Isomeris arborea*
- **Isomeris arborea globosa*
- **Isomeris arborea angustata*
Fallugia paradoxa
Cowania Stansburiana
- **Coleogyne ramosissima*
Kunzia glandulosa
Amygdalus Fremontii
- **Strombocarpus pubescens*
- **Prosopis glandulosa*
- **Krameria parvifolia*
Parosela arborescens
- **Parosela californica*
Parosela Fremontii
Parosela Saundersi
- **Covillea tridentata*
- **Thamnosma montanum*
- **Opuntia ramosissima*
- **Opuntia Bigelovii*
- **Opuntia acanthocarpa*
- **Opuntia echinocarpa*
- **Opuntia Covillei*
- **Opuntia chlorotica*
- **Gaertneria dumosa*
- **Hofmeisteria pluriseta*
- **Coleosanthus attractyloides*
Coleosanthus incana
- **Coleosanthus linifolia*
- **Coleosanthus desertorum*
Coleosanthus Knappiana
Gutierrezia lucida
- **Acamptopappus sphaerocephalus*
- **Stenotopsis interior*
Ericameria monactis
Acamhiacyris Fremontii
- **Chrysothamnus teretifolius*
Chrysothamnus mohavensis
- **Chrysothamnus occidentalis*
- **Baccharis Emoryi*
- **Baccharis sergilioides*
- **Baccharis glutinosa*
- **Pluchea sericea*
- **Bebbia juncea aspera*
- **Viguiera Parishii*
- **Encelia actoni*
- **Encelia frutescens*
Artemesia Parishii
- **Lepidospartum squamatum*
- **Peucephyllum Schottii*
Tetradymia glabrata
Tetradymia stenolepis
Tetradymia spinosa

The species designated by an asterisk (*) also occur in the Colorado Desert.

Colorado Desert.—*Covillea* is also the predominant plant over the dry mesas of the Colorado Desert. Above this belt is an area corresponding to the yucca belt of the Mohave Desert, but comprising a very different group of plants,⁸ of which *Agave deserti* is the most characteristic.

⁸Parish, Bot. Gaz. 36: 222. 1903.

In addition to the species common to both deserts the following are found only in the Colorado Desert:

<i>Neowashingtonia filamentosa</i>	<i>Olneya Tesota</i>
<i>Nolina Parryi</i>	<i>Condalia Parryi</i>
<i>Prosopis velutina</i>	<i>Foquieria splendens</i>
<i>Acacia Greggii</i>	<i>Ramona Vaseyi</i>
<i>Parkinsonia aculeata</i>	<i>Beloperone californica</i>
<i>Parkinsonia microphylla</i>	<i>Gaertneria ilicifolia</i>
<i>Cercidium Torreyana</i>	<i>Coleosanthus frutescens</i>
<i>Krameria Grayi</i>	<i>Gutierrezia bracteata</i>
<i>Parosela Emoryi</i>	<i>Ericameria brachylepis</i>
<i>Parosela Schottii</i>	<i>Baccharis sarothroides</i>
<i>Parosela spinosa</i>	<i>Encelia farinosa</i>

A study of the geographical distribution of the species not common to both deserts shows that the Mohave Desert species are of the Great Basin element, most of them being common to southern Nevada, southern Utah and northern Arizona, and that the species restricted to the Colorado Desert are of southern origin, and extend into Lower California, southwestern Arizona and northwestern Sonora.

EXPLANATION OF PLATES

PLATE A

Relief map of California, from the original model by N. F. Drake. Published through the courtesy of the Department of Geology of Leland Stanford Jr. University.

PLATE B

Dry Lake, San Bernardino Mountains, altitude 3180 meters, showing a pure forest of *Pinus Murrayana* and *Pinus flexilis*. Canadian Zone.

PLATE C

Juniperus occidentalis, Bear Valley, San Bernardino Mountains, altitude 2230 meters. Transition Zone.

PLATE D

Open park-like forest of *Pinus ponderosa Jeffreyi*, Mount Pinos, altitude 2300 meters. Transition Zone.

PLATE E

Pseudotsuga macrocarpa intermingling with the chaparral, Topatopa Mountains, altitude 1800 meters. Upper Austral Zone.

PLATE F

Alnus hambifolia, Waterman Canyon, San Bernardino Mountains, altitude about 1200 meters. Upper Austral Zone.

PLATE G

Pinus Sabiniana, Oakgrove Canyon, Liebre Mountains, altitude 1400 meters. Upper Austral Zone.

PLATE H

Looking northeast across San Bernardino Valley, with Slover Mountain in the foreground and the San Bernardino Mountains in the distance. The valley is Lower Austral; the chaparral-covered slopes of the distant mountains, Upper Austral; the forests on the summits, Transition.

PLATE I

Cleistoyucca arborescens, Mohave Desert, between Mohave and Lancaster, altitude about 800 meters. Lower Austral Zone.

PLATE J

Fig. 1. *Covillea tridentata*, near Willow Springs, Antelope Valley, altitude about 840 meters. Lower Austral Zone.

Fig. 2. *Olneya Tesota*, eastern base of Signal Mountain, Colorado Desert, altitude about sea level. Lower Austral Zone.

ANNOTATED CATALOGUE OF THE SOUTHERN CALIFORNIA TREES AND SHRUBS

PINACEAE. PINE FAMILY.

Leaves usually fascicled, surrounded at base by a sheath; cones maturing the second year.

1. *Pinus*.

Leaves not fascicled, without basal sheath; cones maturing the first year.

Cones pendulous; leaves short-petioled.

2. *Pseudotsuga*.

Cones erect; leaves sessile.

3. *Abies*.

I. PINUS. PINE.

Sheaths deciduous; leaves with 1 fibro-vascular bundle.

Leaves in 5's.

Leaves slender, 8-10 cm. long; cones cylindrical, 20-40 cm. long; wing of seed 2 cm. long.

1. *P. Lambertiana*.

Leaves rigid, 3-6 cm. long; cones oval, 8-16 cm. long; wing a narrow ring, 1 mm. broad.

2. *P. flexilis*.

Leaves 1-4 in a cluster; cones globose; scales much thickened; seeds large.

Leaves usually in 4's.

3. *P. quadrifolia*.

Leaves solitary.

4. *P. monophylla*.

Sheaths persistent; leaves with 2 fibro-vascular bundles.

Leaves in 5's, wing thickened.

5. *P. Torreyana*.

Leaves in 2's or 3's; wing thin.

Leaves in 3's.

Cones deciduous; scales tipped with a prickle.

Cones 7-12 cm. long.

6. *P. ponderosa*.

Cones 12-25 cm. long.

6a. *P. ponderosa* Jeffreyi.

Cones more persistent; scales tapering to stout incurved points.

Leaves grayish-green, drooping; cones chestnut brown, oval, 15-25 cm. long.

7. *P. Sabiniana*.

Leaves blue-green, erect; cones yellowish-brown, long-oval, 25-35 cm. long.

8. *P. Coulteri*.

Leaves in 2's.

Cones deciduous, opening at maturity.

9. *P. Murrayana*.

Cones persistent for years, not opening at maturity.

10. *P. attenuata*.

1. *PINUS LAMBERTIANA* Dougl. Trans. Linn. Soc. 15: 500. 1827.

Pinus Lambertiana minor Lemmon, Second Bienn. Rep. Calif. State Forest. 70, 83. 1888.

Type locality: On the head waters of the Umpqua River.

Distribution: The Sugar pine is characteristic of the Sierran District. It occurs from central Oregon southward to San Pedro Martir Mountain, Lower California. Transition.

Specimens examined: Mount Pinos, *Elmer* 4196; Swartout Valley, San Gabriel Mountains, *Abrams & McGregor* 650; Mount San Antonio, *Abrams* 2701; Strawberry Valley, San Jacinto Mountains, *Leiberg* 3141; Mount San Gorgonio, *Dutton*, 1897; mountains east of San Diego, *Parry*, 1850.

2. *PINUS FLEXILIS* James, Long's Exped. 2: 27. 1823.

Type locality: "Inhabits the arid plains subjacent to the Rocky Mountains, and extends up their sides to the region of perpetual frost."

Distribution: The limber pine occurs on the eastern slopes of the continental divide from Alberta to western Texas, and ranges westward over the mountains of Wyoming, Utah, Nevada, northern New Mexico, northern Arizona and southeastern California. In California it is found along the eastern slope of the Sierra Nevada south of Mono Pass, on the Inyo and Panamint Mountains, and on some of the higher peaks of southern California as noted below. It is characteristic of the Canadian Zone.

Specimens examined: Summit of Mount Pinos, *Abrams & McGregor* 243; North Baldy, San Gabriel Mountains, *Abrams & McGregor* 605; Dry Lake, Mount San Gorgonio, altitude 2800 meters, *Abrams & McGregor* 785; near the summit of Mount San Gorgonio, *Abrams & McGregor* 748; *Leiberg* 3279.

Pinus monticola and *Pinus albicaulis* have been reported from southern California, but I have not seen any specimens, and their presence within our range is doubtful.

3. *PINUS QUADRIFOLIA* Parry; Parl. in DC. Prod. 16, pt. 2: 402. 1868.

Pinus parryana Engelm. Am. Journ. Sci. II. 34: 332. 1862. Not Gord. 1858.

Type locality: "On the mountains east of San Diego."

Distribution: Parry's pine occupies a belt on the mountains of northern Lower California corresponding to that of *P. monophylla* on the mountains bordering the Mohave Desert. It extends northward, sparingly, along the desert slope to the Santa Rosa Mountains of southern California. Upper Sonoran.

Specimens examined: Coyote Canyon, Santa Rosa Mountains, *Leiberg* 3164; *Hall* 2139; mountains east of San Diego, *Parry*, 1850; near Walker's ranch, between Campo and Jacumba Hot Spring, *Vasey*, 1880.

4. *PINUS MONOPHYLLA* Torr. & Frem. in Frem. Second Rep. 319, pl. 4. 1845.

Pinus Fremontiana Endl. Syn. Conif. 183. 1847, in part.

Type locality: "Extensively diffused over the mountains of northern California from long. 111° to 120°, and through a considerable range of latitude."

Distribution: The piñon is characteristic of the Great Basin district. It extends over the mountains of the Great Basin, ranging westward to the eastern slopes of the Sierra Nevada and southward along the desert slopes of the southern California mountains to the northern border of Lower California. In southern California the piñon forms a distinct belt along the northern slopes of the San Gabriel and the San Bernardino Mountains, ranging from 1000 to 1500 meters in altitude. South of the San Bernardino Mountains it becomes rare and finally is superseded by *P. quadrifolia* near the Mexican boundary. Upper Sonoran.

Specimens examined: Mount Pinos, *Elmer* 3983; near the Frazier Borax Mine, Mount Pinos, *Abrams* & *McGregor* 269; Mutau Flat, head of Piru Creek, *Abrams* & *McGregor* 186; Lone Pine Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 669; between Bear Valley and Cushenberry Spring, *Abrams* 2136; Morongo King

Mine, San Bernardino Mountains, *Parish* 3456; eastern slope of Mount San Jacinto, 800 meters, *Leiberg* 3163.

5. *PINUS TORREYANA* Parry, Bot. Mex. Bound. 210, *pl.* 58, 59. 1859.

Pinus lophosperma Lindl. Gard. Chron. 1860: 46. 1860.

Type locality; "Bluffs near the mouth of Solidad Creek, 10 miles north of San Diego, California."

Distribution: The Del Mar or Torrey pine has the most restricted range of any pine in North America. It extends along the coast in the vicinity of Soledad River, San Diego County, for about 8 miles and inland 2 or 3 miles. In addition to this one locality it has been found only on the east end of Santa Rosa Island. Upper Sonoran or Lower Sonoran.

Specimens examined: Santa Rosa Island, *Blanche Trask*, Oct. 1900; Soledad, *Pringle*, April 26, 1882; *Dudley*, July 24, 1899.

6. *PINUS PONDEROSA* Dougl.; Lawson, Man. Agr. 354. 1836.

Type locality: Washington, on the Spokane River, according to Piper.

Distribution: The western yellow pine is the most characteristic tree of the Western Arid Area of the Transition Zone, extending from British Columbia southward to western New Mexico and southern California. In southern California this pine is common throughout the Transition Zone of all the mountain ranges.

Specimens examined: Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 478; Tejon Pass, *Coville & Funston* 1223; Santa Ana Canyon, San Bernardino Mountains, altitude 1500 meters, *Abrams & McGregor*, July 14, 1908.

6a. *PINUS PONDEROSA JEFFREYI* (Murray) Vasey, Rep. Com. Agr. 1875: 179. 1876.

Pinus jeffreyi Murray, Rep. Bot. Exped. Oreg. 2, *pl.* 1. 1853.

Pinus deflexa Torr. Bot. Mex. Bound. 209. 1859.

Type locality: "Shasta Valley, N. California."

Distribution: Cascade Mountains of southern Oregon southward through the Sierra Nevada and southern California to San Pedro Martir. The separation of this pine from typical *Pinus ponderosa*



is often difficult in southern California. Some trees with plated bark have small cones, and others have cones fully as large as any of the variety. Both extremes also occur on trees with the darker furrowed bark. In almost any locality, but especially in the vicinity of Green Valley, San Bernardino Mountains, it is possible to gather a series of cones ranging in size from the typical to that of the variety.

Specimens examined: Mount Pinos, *Abrams & McGregor 241*; Mount San Geronio, *Dutton*, 1897; mountains east of San Diego, *Parry*, 1850.

7. *PINUS SABINIANA* Dougl. Trans. Linn. Soc. 16: 749. 1833.

Type locality: Indefinite, but probably from the mountains near San Juan Mission, Monterey County. Douglas forwarded his paper in which this species was described from this place.

Distribution: The digger pine is characteristic of the Intramontane District, occupying a distinct belt below the Sierran District on the western slope of the Sierra Nevada, and on the inner Coast Ranges. A few trees penetrate through Tejon Pass and extend southward along the western margin of Antelope Valley to Elizabeth Lake, Liebre Mountains. Upper Sonoran.

Specimens examined: Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor 399*.

8. *PINUS COULTERI* Lamb. in Don, Trans. Linn. Soc. 17: 440. 1837.

Pinus macrocarpa Lindl. Bot. Reg. Misc. 61. 1840.

Pinus Sabiniana Coulteri Don; Loud. Arb. et Fruti. 4: 2250. 1838.

Type locality: "On the mountains of Santa Lucia near the Mission of San Antonio, in latitude 36°, within sight of the sea and at an elevation of from 3000 to 4000 feet above the sea."

Distribution: Coulter's pine occurs in the Coast Ranges of California from the vicinity of Mount Diablo south to the Cuernavaca Mountains. In southern California it is scattered, usually sparingly, through the coniferous forests of the San Gabriel, the San Bernardino, the San Jacinto and the Cuernavaca Mountains. In the latter range it forms considerable forest around Julian. Transition.

Specimens examined: La Cumbre Peak, Santa Ynez Mountains, *Abrams* 4315; Deep Creek, San Bernardino Mountains, *Abrams* 2067; The Pines, Santa Ana Canyon, San Bernardino Mountains, *Abrams* & *McGregor* 811; Santa Ana Mountains, near Elsinore, *Dutton*, 1897; near Julian, Cuimaca Mountains, *Vasey*, June, 1880.

9. *PINUS MURRAYANA* Balfour, Rep. Bot. Exped. Oreg. 2, pl. 3, f. 2. 1853.

Pinus contorta Murrayana Engelm. Bot. Calif. 2: 126. 1880.

Type locality: "On the Siskiyou Mountains."

Distribution: The lodge-pole pine extends from southern Alaska south and east to southern Colorado and Utah, and on the Pacific Coast along the higher altitudes of the mountain ranges to Mt. San Pedro Martir, Lower California. In southern California it is confined to the Canadian Zone, seldom being found below 2400 meters.

Specimens examined: North Baldy, San Gabriel Mountains, *Abrams* & *McGregor* 624; Mount San Antonio, *Abrams* 1946; Bear Valley, San Bernardino Mountains, *Abrams* 2080; Mount San Geronio, *Leiberg* 3280; *Abrams* & *McGregor* 781.

10. *PINUS ATTENUATA* Lemmon, Gard. & Forest 5: 65. 1892.

Pinus californica Hartw. Journ. Hort. Soc. 2: 189. 1847. Not Loisel. 1812.

Pinus tuberculata Gord. Journ. Hort. Soc. 4: 218. 1849. Not Don. 1837.

Type locality: "To the south of Monterey, in lat. 36°, near the level of the sea, and growing almost to the beach." The locality given here is that for *P. tuberculata*, since *P. attenuata* was based upon that species.

Distribution: The knob-cone pine extends from Mackenzie River, Oregon to the San Bernardino Mountains. In southern California it is limited to a narrow belt along the southern slope of the San Bernardino Mountains in the vicinity of the City Creek Canyon. Upper Sonoran.

Specimens examined: San Bernardino Mountains, on the City Creek road, altitude 875 meters, *Abrams* 2802.

2. PSEUDOTSUGA. DOUGLAS FIR.

1. PSEUDOTSUGA MACROCARPA (Torr.) Mayr. Wald. Nordam. 278.
1890.

Abies Douglasii macrocarpa Torr. Ives Rep. 28. 1861.

Abies macrocarpa Vasey, Gard. Monthly 1876: 22. 1876.

Pseudotsuga Douglasii macrocarpa Engelm. Bot. Calif. 2: 120.
1880.

Type locality: "Mountains near San Felipe," San Diego County.

Distribution: The big-cone spruce is the most characteristic tree of southern California. It occupies the upper altitudes of the Upper Sonoran on the coastal slope and extends into the lower parts of the Transition Zone. It occurs in the Santa Ynez Mountains, and in the vicinity of Fort Tejon extends southward to San Pedro Martir Mountain.

Specimens examined: La Cumbre Peak, Santa Ynez Mountains, *Abrams 4314*; Fort Tejon, *Abrams & McGregor 301*; Topatopa Mountains, *Abrams & McGregor 81*; Mount Wilson, San Gabriel Mountains, *Abrams*, July, 1906; Cleghorn Canyon, San Bernardino Mountains, *Abrams & McGregor 706*; Mount Santiago, Santa Ana Mountains, *Helen D. Geis*, 1903.

3. ABIES. FIR.

1. ABIES CONCOLOR Lindl. & Gord. Journ. Hort. Soc. 5: 210.
1850.

Picea concolor Gord. Pinetum 155. 1858.

Type locality: "On the mountains of New Mexico."

Distribution: Mountains of southern Oregon south to Mount San Pedro Martir, and extending eastward over the mountains of Nevada, Utah, western Colorado, and northern Arizona and New Mexico. In southern California the white fir is one of the common components of the coniferous forests especially in the upper half of the Transition Zone.

Specimens examined: Mount Pinos, *Elmer 4198*; *Abrams & McGregor 254*; Mount San Antonio, San Gabriel Mountains, *Abrams*, July, 1901; Strawberry Valley, San Jacinto Mountains, *Leiberg 3139*.

CUPRESSACEAE. CYPRESS FAMILY.

Monoecious; cone-scales woody.

Leaves in whorls of 4; cones and scales oblong.

Leaves opposite; cones globose; scales peltate.

Dioecious; leaves opposite; cones berry-like, their scales becoming fleshy.

1. *Heyderia*.

2. *Cupressus*.

3. *Juniperus*.

1. HEYDERIA. INCENSE CEDAR.

1. *HEYDERIA DECURRENS* (Torr.) K. Koch, Dendrol. 2: 177. 1873.

Libocedrus decurrens Torr. Pl. Frem. pl. 3. 1854.

Type locality: "Upper waters of the Sacramento, particularly from lat. 38° 40' to about 41° N. lat."

Distribution: The post or incense cedar extends from the Santiam River in the southern Cascade Mountains southward through the Sierran District, of which it is one of the most characteristic trees. The southern limit, as that of so many of the trees peculiar to the Sierran District, is Mount San Pedro Martir, Lower California. Transition.

Specimens examined: Rock Creek Canyon, San Gabriel Mountains, *Abrams & McGregor* 574; Huston's Flat, San Bernardino Mountains, *Shaw*, Aug. 1900; Strawberry Valley, San Jacinto Mountains, *Leiberg* 3149; Cuamaca Mountains, near Talley's ranch, *Palmer* 3; Laguna, *Mearns* 3653.

2. CUPRESSUS. CYPRESS.

1. *CUPRESSUS GUADALUPENSIS* S. Wats. Proc. Am. Acad. 14: 300. 1879.

Cupressus macrocarpa guadalupensis Masters, Journ. Linn. Soc. 31: 343. 1896.

Type locality: "On Guadalupe Island, off the coast of Lower California."

Distribution: A small grove of cypress near the Jamul Valley, San Diego County, seems to belong to this insular species.

Specimens examined: Cypress canyon, between Oneonta and Dulgura, *Forbes*, Dec. 3, 1907.

3. JUNIPERUS. JUNIPER.

Seeds 1 or 2; cotyledons 4-6.

Leaves rounded at the apex, conspicuously glandular on the back.

1. *J. californica*.

Leaves acute or acuminate, glandless.

2. *J. utahensis*.

Seeds 2 or 3; cotyledons 2; leaves conspicuously glandular on the back.

3. *J. occidentalis*.

1. *JUNIPERUS CALIFORNICA* Carr. Rev. Hort. IV. 3: 352, f. 21. 1854.

Juniperus tetragona osteosperma Torr. Pacif. R. Rep. 4: 141. 1857.

Sabina californica Antoine, Cupress. Gatt. 52, pl. 71, 72. 1857.

Type locality: "En Californie."

Distribution: The California juniper is characteristic of the desert slopes of the mountains extending from the southern Sierra Nevada to Lower California. It also occurs in the more arid parts of the Great Valley, and on dry washes on the coastal slope in southern California. Upper and Lower Sonoran.

Specimens examined: Ten Sycamore Flat, Sespe Creek, *Abrams & McGregor* 168; Fort Tejon, *Abrams & McGregor* 302; Palmdale, *Elmer* 3633; Big Tejunga Wash, San Fernando Valley, *Abrams* 1374; Rock Creek, San Gabriel Mountains, *Abrams & McGregor* 531; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 618; Cajon Pass, *Coville & Funston* 125; Morongo Canyon, *Parish* 2985; near Mentone, *Abrams & McGregor* 824; San Felipe Canyon, *Palmer* 17; San Jacinto Mountains, *Leiberg* 3159; Jacumba Hot Spring, *Abrams* 3648, 3649.

2. *JUNIPERUS UTAHENSIS* (Engelm.) Lemmon, Rep. Calif. State Board Forest. 3: 183, pl. 28, f. 2. 1890.

Juniperus californica utahensis Engelm. Trans. St. Louis Acad. 3: 588. 1877.

Juniperus occidentalis utahensis Veitch, Man. Conif. 289. 1881.

Type locality: "All over the southern parts of Utah and into Arizona and Nevada."

Distribution: Western Colorado and Utah to northern Arizona and the eastern limits of the Mohave Desert, where it occurs within our range on the Providence Mountains. (See introduction.) Upper Sonoran.

Specimens examined: Providence Mountains, *Brandege*, May 26, 1902.

3. *JUNIPERUS OCCIDENTALIS* Hook. Fl. Bor. Am. 2: 166. 1838.

Type locality: "Common on the higher parts of the Columbia."

Distribution: This juniper extends from western Idaho and eastern Washington southward along the Cascade Mountains and the Sierra Nevada to the San Jacinto Mountains. In southern California it is found in the vicinity of Bear Valley, and toward the summits of Mount San Antonio and Mount San Jacinto, occupying an arid belt intermediate between the Transition and the Canadian Zones.

Specimens examined: Bear Valley, San Bernardino Mountains, *Leiberg* 3316; *Abrams*, Aug. 3, 1901.

GNETACEAE. JOINT-FIR FAMILY.

1. *EPHEDRA*. MEXICAN TEA.

Scales and bracts in 2's.

Branches bright green, erect and broom-like.

1. *E. viridis*.

Branches pale glaucous green, divergent.

2. *E. nevadensis*.

Scales and bracts in 3's.

3. *E. californica*.

1. *EPHEDRA VIRIDIS* Coville, Contr. Nat. Herb. 4: 220. 1893.

Type locality: "Near Crystal Spring, Cosco Mountains, Inyo County, California."

Distribution: Western slopes of the Mohave Desert eastward to southern Nevada. This species is characteristic of the piñon belt on the mountain slopes of the Mohave Desert. Upper Sonoran.

Specimens examined: Frazier Borax Mine, Mount Pinos, *Abrams* & *McGregor* 216, 217; Ten Sycamore Flat, Sespe Creek, *Abrams* & *McGregor* 174; near Bear Valley, *Leiberg* 3315; Cushenberry Spring, *Parish* 4980; Rose Mine, San Bernardino Mountains, *Parish* 2975.

2. *EPHEDRA NEVADENSIS* S. Wats. Proc. Am. Acad. 14: 298. 1879.

Type locality: "Pah Ute Mountains, altitude 5000 feet; Carson City, altitude 5000 feet."

Distribution: Nevada and Utah southward through the desert regions to Lower California. In southern California this species is characteristic of the juniper and the yucca belts of the deserts. Upper and Lower Sonoran.

Specimens examined: Mohave Desert, near Varren Station, *Abrams* & *McGregor* 499; near Acton, *Elmer* 3599; Jacumba Hot Spring, *Abrams* 3676; Mountain Spring, *Mearns* 3079.

3. *EPHEDRA CALIFORNICA* S. Wats. Proc. Am. Acad. 14: 300. 1879.

Type locality: "Promontory near San Diego, and Jamul Valley."

Distribution: The Mohave Desert, southward to Lower California, extending westward to the coast in the vicinity of San Diego and southward. Lower Sonoran.

Specimens examined: Between Victor and Stoddard Wells, *Coville & Funsten* 159; Whitewater, S. B. & W. F. Parish 653; eastern slope of San Geronio Pass, *Leiberg* 3234; Coyote Canyon, Santa Rosa Mountains, *Hall* 2863; Jacumba Hot Spring, *Mearns* 3332; Campo, *Abrams* 3600; North Coronado, *Knapp*, 1895; Tia Juana, *Abrams* 3489.

PHOENICACEAE. PALM FAMILY.

I. NEOWASHINGTONIA. CALIFORNIA FAN-PALM.

- I. *NEOWASHINGTONIA FILAMENTOSA* Sudworth, U. S. Dept. Agr. Div. Forest. Bull. no 14: 105. 1897.

Pritchardia filamentosa Wendl. Bot. Zeit. 34: 807. 1876.

Pritchardia filifera Linden, Ill. Hort. 24. 1877.

Washingtonia filifera Wendl. Bot. Zeit. 37: 68. 1879.

Washingtonia filamentosa Kuntze, Rev. Gen. Pl. 2: 737. 1891.

Type locality: Described from young plants cultivated in Europe. The source of the seeds is not definitely known.

Distribution: The California fan-palm occurs in a few scattered groves along the base of the desert ranges a few miles north of Indio, and again at Palm Springs on the eastern base of Mount San Jacinto. An interesting account, and an exhaustive bibliography of the genus, was given by Parish in the Botanical Gazette, Dec., 1907.

Specimens examined: Palm Springs, *Dudley*, Dec. 1902.

LILIACEAE. LILY FAMILY.

Flowers polygamo-dioecious; perianth-segments 1-nerved; filaments filiform; fruit thin and membranous, bursting irregularly. 1. *Nolina*.

Flowers perfect; perianth-segments many-nerved; filaments clavate; fruit a thick-walled capsule, or baccate, septicidal or loculicidal.

Style filiform; stigma capitate, long-papillate.

2. *Hesperoyucca*.

Style stout or wanting, 6-notched, openly perforate.

Perianth-segments thick; nectar glands small; style wanting.

3. *Cleistoyucca*.

Perianth-segments thin; nectar glands large; style evident.

4. *Yucca*.

1. NOLINA.

1. NOLINA PARRYI S. Wats. Proc. Am. Acad. 14: 247. 1879.

Type locality: "California (western border of the San Bernardino Desert); Parry, 1876."

Distribution: Desert slopes of the San Bernardino and the San Jacinto Mountains on the western border of the Colorado Desert. Lower Sonoran.

Specimens examined: Rattlesnake Canyon, San Bernardino Mountains, *Parish* 3145; Tahquitz Valley, San Jacinto Mountains, altitude 2000 meters, *Hall* 2432; Southeastern base of Mount San Jacinto, altitude 1500 meters, *Hall* 1819; San Felipe, *Bran-degee*, April 30, 1894.

2. HESPEROYUCCA. SPANISH BAYONET.

1. HESPEROYUCCA WHIPPLEI (Torr.) Baker, Kew Bull. 1892: 8. 1892.

Yucca Whipplei Torr. Bot. Mex. Bound. 222. 1859.

Yucca graminifolia Wood, Proc. Acad. Philad. 1868: 167. 1868.

Yucca Whipplei graminifolia Baker, Journ. Linn. Soc. 18: 230. 1880.

Type locality: "Near San Pasqual, southern California."

Distribution: Monterey County and the southern Sierra Nevada southward to the vicinity of Alamo, Lower California. In southern California the Spanish bayonet is common throughout the chaparral covered areas of the coast slope; it also occurs in the piñon belt of the desert slopes. A purple flowered form was collected by the writer (3547) in the foothills of San Diego County. In the vicinity of Fort Tejon (*Abrams & McGregor* 270) a more compact form, with flowers scarcely half the normal size, grows associated with typical plants.

Specimens examined: Soldiers Camp, near Fort Tejon, *Abrams & McGregor* 270, 271; Sulphur Mountain Spring, *Abrams & McGregor* 41; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2564; Cajon Pass, *Bigelow*, 1853; San Pasqual, *Schott*; near Dulzura, *Abrams* 3547.

3. CLEISTOYUCCA. JOSHUA TREE.

1. CLEISTOYUCCA ARBORESCENS (Torr.) Trelease, Rep. Mo. Bot. Gard. 13: 41. 1902.

Yucca draconis arborescens Torr. Pacif. R. Rep. 4: 147. 1857.

Yucca brevifolia Engelm. King Exped. 5: 496. 1871. Not Schott. 1859.

Yucca arborescens Trelease, Rep. Mo. Bot. Gard. 3: 163. 1892.

Type locality: "Sandy and gravelly plains west of the Colorado, California."

Distribution: Mohave Desert of southern California east and north to southern Nevada, northeastern Arizona, and southwestern Utah. It forms orchard-like groves between the juniper and *Covillea* belts. Lower Sonoran.

Specimens examined: Desert slopes of the Tehachapi Mountains, near Willow Springs, *Abrams & McGregor 430*.

4. YUCCA. YUCCA.

1. YUCCA MOHAVENSIS Sargent, Gard. & For. 9: 104. 1896.

Type locality: "Most abundant and grows to its largest size on the Mohave Desert."

Distribution: Northwestern Arizona and southwestern Nevada westward through the Mohave Desert and southward along the western border of the Colorado Desert to northern Lower California, where it extends westward into the coastal region in the vicinity of San Diego. This species is said to have been collected by Parry near Monterey, but we strongly suspect that this is an error through confusion of labels. Parry's plants in all probability came from San Diego, for so far as we are aware the plant has not been found in the coastal region north of this locality.

Specimens examined: San Dieguito (Bernardo), *Abrams 3409*; San Diego, *Jones 3163*; San Timotea Canyon, *Hall 5751*; western base of Mount Santa Rosa, *Hall 1905*.

SALICACEAE. WILLOW FAMILY.

Stamens numerous, bracts fimbriate or lacerate.
Stamens 1-5; bracts entire or denticulate.

1. *Populus*.
2. *Salix*.

I. POPULUS. POPLAR OR COTTONWOOD.

Petioles terete; ovary tomentose.

1. *P. trichocarpa*.

Petioles flattened; ovary glabrous.

Leaves coarsely serrate-dentate; capsules globose; stigma-lobes dilated.

2. *P. Fremontii*.

Leaves finely crenate-serrate; capsules oblong-conic; stigma-lobes linear.

3. *P. tremuloides*.

1. *POPULUS TRICHOCARPA* Torr. & Gray; Hook. Ic. Pl. 9: pl. 878. 1852.

Type locality: "Santa Clara River, near Beneventano [Ventura], California."

Distribution: British Columbia and western Montana, southward throughout California. The mountain forms often develop narrow leaves that approach *P. angustifolia*, but there seem to be no stable characters that warrant their separation as a distinct variety or species. In southern California this species occurs in the Upper Sonoran on the coastal slope, and in the Transition and the lower altitudes of the Canadian Zones. In the Lower Sonoran of the interior valleys, at San Diego, and on the deserts, it is replaced by *P. Fremontii*.

Specimens examined: Sulphur Mountain Spring, near Santa Paula, *Abrams & McGregor* 58; Monrovia Canyon, San Gabriel Mountains, *Dudley*, Nov. 20, 1907; Bear Valley, San Bernardino Mountains, *Abrams & McGregor* 738.

2. *POPULUS FREMONTII* S. Wats. Proc. Am. Acad. 10: 350. 1875.

Type locality: "On Deer Creek at 'Lassen's' in the upper Sacramento Valley."

Distribution: Sacramento Valley south to northern Lower California, and eastward to southern Colorado and western Texas. In southern California this species occurs along most of the streams of the interior valleys, approaching the coast in San Diego County; it is also abundant in the canyons on the desert slopes of all the mountains. A form with pubescent twigs, foliage, and peduncles, which occurs on the delta of the Colorado River, may prove worthy of recognition when more complete material is at hand. My own specimens from Elsinore Lake are fully as pubescent as the delta plants, but specimens from Cajon Pass (*Abrams & McGregor* 695) are only sparsely so, thus approaching the typical form which is glabrous.

Specimens examined: Elizabeth Lake, Liebre Mountains, *Abrams & McGregor 412*; Rock Creek, San Gabriel Mountains, *Abrams & McGregor 556*; near Claremont, *Baker 5347*; Cajon Pass, *Abrams & McGregor 695*; San Bernardino, *Parish*, March, 1902; San Dieguito River, near San Dieguito (Bernardo), *Abrams 3370*; Calexico, *G. D. Abrams*, Feb., 1910.

3. *POPULUS TREMULOIDES* Michx. Fl. Bor. Am. 2: 243. 1803.
Type locality: "Hab. in Canada et Noveboraco."

Distribution: The quaking aspen is distributed through the Canadian Zone of California, and extends from San Pedro Martir northward to Alaska, thence across the northern part of the continent, ranging southward along the mountains to New Mexico and Pennsylvania. Only one locality has been discovered in southern California, viz., Grinnell (Univ. Calif. Pub. Zoology 5: 34. 1908) reports several groves "on the west side of the upper Fish Creek Canyon, north of San Gorgonio Peak, at altitudes of 7000 to 7600 feet."

2. SALIX. WILLOW.

Stamens 3 or more; bark furrowed; trees.

Leaves green on both surfaces; stipules glandular; ovary often pubescent.

1. *S. vallicola*.

Leaves pale beneath; capsule glabrous.

Petioles with glands near the base of the blade; stipules conspicuous, glandular.

2. *S. lasiandra*.

Petioles and stipules not glandular, the latter often wanting.

3. *S. laevigata*.

Stamens 2; bark not furrowed; trees or shrubs.

Scales of the ament black or black-tipped.

Ovary and capsule glabrous.

Leaves entire or remotely and obscurely serrate, becoming rusty-glaucous beneath; scales pubescent or short-villous.

4. *S. lasiolepis*.

Leaves finely serrate, becoming smooth and pale beneath; scales long-villous.

5. *S. Watsoni*.

Ovary and capsule pubescent.

Aments appearing before the leaves; styles none.

6. *S. Scouleriana*.

Aments appearing with the leaves; styles evident.

7. *S. glaucops*.

Scales of the ament pale.

Ovary glabrous; leaves sparsely appressed-pubescent.

8. *S. exigua*.

Ovary pubescent at least sparsely so when young; leaves more or less densely silky.

9. *S. argophylla*.

1. *SALIX VALLICOLA* (Dudley) Britton, N. Am. Trees 184. 1908.
Salix nigra vallicola Dudley in Abrams, Fl. Los Angeles 100. 1904.

Type locality: "Along the Santa Ana River near Orange," California.

Distribution: Streambanks in the Sacramento and San Joaquin valleys, southward into southern California. This variety differs from the true *Salix nigra* in its glandular stipules, and obovate or rounded instead of ovate bracts of the staminate aments. Specimens from the Colorado Desert (*Abrams 3195*) have the bracts of the staminate aments glandular-toothed. There are other evidences that this desert plant is distinct from the coast species, but more material is needed to satisfactorily determine its relationship. Upper and Lower Sonoran.

Specimens examined: Gorman's Station, Antelope Valley, *Abrams & McGregor 314*; Santa Ana River, near Orange, *Abrams 3256*; near Santa Ana, *Helen D. Geis*; Elsinore, *Baker 4146*; San Dieguito River, *Abrams 3371*; San Diego River, San Diego, *Abrams 3410*; Tia Juana, *Abrams 3484*; Blue Lake, Imperial County, *Abrams 3195*.

2. *SALIX LASIANDRA* Benth. Pl. Hartw. 335. 1857.

Type locality: "Ad flumen Sacramento."

Distribution: Southwestern British Columbia and western Washington and Oregon, southward to southern California. Upper Sonoran and Transition.

Specimens examined: Los Angeles River, near Tropic, *Abrams 1449*; Pasadena, *Grant 1160*; vicinity of San Bernardino, *Parish 4635, 4677*; Bear Valley, San Bernardino Mountains, *Abrams & McGregor 739*.

3. *SALIX LAEVIGATA* Bebb. Am. Nat. 8: 202. 1874.

Type locality: "California, at Santa Cruz, also 'Ukiah' and Alameda Co."

Distribution: Siskiyou County south to the northern part of Lower California. In southern California this species is frequent along the principal streams. Upper Sonoran and Transition.

Specimens examined: Sulphur Mountain Spring, near Santa Paula, *Abrams & McGregor 60*; Topatopa Mountains, *Abrams & McGregor 121*; Los Angeles River, near Rivera, *Abrams 3253*; Ballona Creek, near Mesmer, *Abrams 1467*; near Chatsworth,

Abrams 1362; Santa Ana, *Helen D. Geis* 554; Cosey Dell, Cajon Pass, *Abrams & McGregor*, 693; West Fork of Mohave River, *Abrams & McGregor* 722; Jamul Valley, *Susan G. Stokes*, July, 1895; near El Nido, *Abrams* 3541; Campo, *Abrams* 3615.

4. *SALIX LASIOLEPIS* Benth. Pl. Hartw. 335. 1857.

Type locality: "Ad ripas fluviorum Salinas et Carmel prope Monterey."

Distribution: Klamath River, southward to the northern part of Lower California, also in southern Arizona. In southern California this is the most common willow in the valleys and foothills. A form occurs in the upper parts of the Transition Zone strikingly different in habit. It is a bush forming low round clumps. The leaves are much smaller and paler.

Specimens examined: Santa Barbara, *Elmer* 3911; Santa Ynez Mountains, *Elmer* 3873; Topatopa Mountains, altitude 1860 meters, *Abrams & McGregor* 105; Rock Creek, San Gabriel Mountains, *Abrams & McGregor* 541; Inglewood, *Abrams* 3103; vicinity of San Bernardino, *Parish*, May, 1899; Fish Creek, San Bernardino Mountains, *Grinnell* 35.

5. *SALIX WATSONI* (Bebb.) Rydb. Bull. Torr. Bot. Club 33: 137. 1906.

Salix cordata Watsoni Bebb. Bot. Calif. 2: 86. 1880.

Type locality: "Near Carson City (*Watson*), and in Sierra County, *Lemmon*."

Distribution: Utah westward to the eastern slopes of the Sierra Nevada and southward to the San Jacinto Mountains.

Specimens examined: Tahquitz Creek, San Jacinto Mountains, *Hall* 2447.

6. *SALIX SCOULERIANA* Barratt; Hook. Fl. Bor. Am. 2: 145. 1838.

Salix flavescens Nutt. N. Am. Sylva 1: 65. 1842.

Salix Nuttallii Sarg. Gard. & Forest 8: 463. 1895.

Type locality: "North West America, on the Columbia."

Distribution: Southern Assiniboia southward through the Rocky Mountains to northern New Mexico and Arizona, and along the Cascada Mountains and the Sierra Nevada to the San Bernardino Mountains. Transition.

Specimens examined: Faunskin Park, San Bernardino Moun-

tains, *Parish 4994*; Snow Canyon, San Bernardino Mountains, *Parish 5047*; Deep Creek, San Bernardino Mountains, *Abrams & McGregor 729*; Bluff Lake, *Grinnell 100*.

7. *SALIX GLAUCOPS* Anderss. in DC. Prod. 16, pt. 2: 281. 1858.

Salix glauca villosa Anderss. Sal. Bor. Am. 22. 1858.

Salix glaucops villosa Anderss. in DC. Prod. 16, pt. 2: 281. 1858.

Type locality: "In omni America septentrionali usque ad fl. Saskatchewan crescere dicitur."

Distribution: British Columbia eastward to the Rocky Mountains and southward to New Mexico and southern California. Canadian Zone.

Specimens examined: Dollar Lake Canyon, altitude 2790 meters, *Hall 7667*; *Abrams & McGregor 767*.

8. *SALIX EXIGUA* Nutt. N. Am. Sylva 1: 75. 1842.

Salix longifolia exigua Bebb. Bot. Calif. 2: 85. 1880.

Type locality: "On the immediate border of the Oregon below its confluence with the Wahlamet."

Distribution: The Columbia Basin, eastward through the Great Basin region and southward to New Mexico. In California I have seen specimens from only the Imperial Valley, where it is often abundant along the main canals and channels leading from the Colorado River. Upper and Lower Sonoran.

Specimens examined: Near Calexico, *G.D. Abrams*, July, 1902.

9. *SALIX ARGOPHYLLA* Nutt. N. Am. Sylva 1: 71, pl. 20. 1842.

Salix longifolia argophylla Anderss. in DC. Prod. 16, pt. 2: 214. 1868.

Salix Hindsiana Benth. (?) Pl. Hartw. 335. 1857.

Salix Parishiana Rowlee, Bull. Torr. Bot. Club 27: 249. 1900.

Salix macrostachya leucodermis Rowlee, Bull. Torr. Bot. Club 27: 250. 1900.

Type locality: "On the Boise River, toward its junction with the Shoshonee," Idaho.

Distribution: Washington south through Oregon and California to northern Lower California, and extending eastward to the Rocky Mountains. Upper and Lower Sonoran.

Specimens examined: Oakgrove Canyon, Liebre Mountains,

Abrams & McGregor 406; Jacumba Hot Spring, *Abrams* 3679; Ten Sycamore Flat, Sespe Creek, *Abrams & McGregor* 169; between Oakgrove Canyon & Elizabeth Lake, *Abrams & McGregor* 406; Inglewood, *Abrams* 1493; Cienega, *Abrams*, March, 1899; vicinity of San Bernardino, *Parish* 4486; Waterman Canyon, *Shaw & Illingsworth* 4; Cosey Dell, Cajon Pass, *Abrams & McGregor* 694; Santa Ana River, *Helen D. Geis* 553; Tia Juana River, *Herre*, Aug. 1902, *Abrams* 3485; San Diego River, San Diego, *Abrams* 3419.

MYRICACEAE. BAYBERRY FAMILY.

1. MYRICA. WAX MYRTLE.

1. *MYRICA CALIFORNICA* Cham. & Sch. *Linnaea* 6: 535.
1831.

Type locality: "Legimus ad portum sancti Francisci Californiae."

Distribution: Moist, usually wooded slopes near the coast, from Puget Sound to the vicinity of Santa Monica. This species is most abundant in the Pacific Humid Area of the Transition Zone.

Specimens examined: Rustic Canyon, near Santa Monica, *Hasse*, May and July, 1890; *McClatchie*, Aug. 30, 1896.

JUGLANDACEAE. WALNUT FAMILY.

1. JUGLANS. WALNUT.

1. *JUGLANS CALIFORNICA* S. Wats. *Proc. Am. Acad.* 10: 349.
1875, excluding synonymy.

Type locality: "Vicinity of San Francisco growing 40-60 feet high and 2-4 feet in diameter, and ranging southward to Santa Barbara, Southern Arizona and Sonora."

Distribution: Ojai Valley, Ventura County, southward to the Santa Ana Mountains. It is most abundant on north slopes of the coastal mountains (Sulphur Mountain, Santa Monica Mountains, and Puente Hills) but extends eastward along the San Gabriel and the San Bernardino Mountains to the vicinity of San Bernardino. Upper Sonoran.

Specimens examined: Sulphur Mountain, *Abrams & McGregor* 9; Cahuenga Pass, *Abrams* 1243; Glendora, *Baker* 5294; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 691.

BETULACEAE. BIRCH FAMILY.**I. ALNUS. ALDER.**

I. ALNUS RHOMBIFOLIA Nutt. N. Am. Sylva 1: 33. 1842.

Type locality: "In the vicinity of Monterey, in Upper California."

Distribution: Idaho and eastern Washington south through the Sierra Nevada and the Coast Ranges to San Diego. In southern California the alder is most frequent along streams in the mountains from 400-1000 meters. On the coastal slope it sometimes extends along the streams well into the valleys, especially in the vicinity of Pasadena. On the desert slopes it extends down the principal streams to the juniper belt. Transition and Upper Sonoran.

Specimens examined: Sulphur Mountain Spring, near Santa Paula, *Abrams & McGregor* 59; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 126; Rock Creek, desert slope of the San Gabriel Mountains, *Abrams & McGregor* 527; Arroyo Seco, near Pasadena, *Grant* 36.

FAGACEAE. BEECH FAMILY.

Involucre 1-flowered; fruit an acorn.

Staminate aments densely flowered, erect; cup of acorn conspicuously echinate.

1. *Pasania*.

Staminate aments loosely flowered, drooping; cup of acorn scaly (in ours), not echinate.

2. *Quercus*.

Involucre 1-3-flowered, becoming a spiny bur in fruit.

3. *Castanopsis*.

I. PASANIA. TAN-BARK OAK.

I. PASANIA DENSIFLORA (Hook. & Arn.) Oerst. in Klob. Vidensk. Meddel. 84. 1866.

Quercus densiflora Hook. & Arn. Bot. Beech. 391. 1841.

Type locality: "California." First collected by Douglas.

Distribution: The tan-bark oak extends from the Umpqua Valley of southern Oregon southward through the Coast Ranges to Santa Barbara County, and on the western slopes of the Sierra Nevada as far south as Mariposa County. Transition.

Specimens examined: La Cumbre Peak, Santa Ynez Mountains, *Abrams* 4316.

I. QUERCUS. OAK.

Styles slender, elongated; nut tomentose within; cup-scales thin; leaves or their lobes bristle-tipped; wood reddish. (Black oaks.)

Acorns developing the second year.

Leaves deciduous, large, deeply lobed.

1. *Q. Kelloggii*.

Leaves evergreen, small, bright green and shiny beneath.

2. *Q. Wislizeni*.

Acorns developing the first year; leaves evergreen, pale beneath.

3. *Q. agrifolia*.

Styles short, dilated; scales thickened on the back; leaves seldom bristle-tipped; wood white. (White oaks.)

Acorns developing the second year; cups very thick; nuts tomentose within; leaves evergreen, tomentose beneath.

Leaves entire or spinose-toothed; branchlets not divaricate; acorns rounded at apex.

4. *Q. chrysolepis*.

Leaves coarsely spinose-toothed, undulate; branchlets rigid and divaricate; acorns pointed at apex.

5. *Q. Dunnii*.

Acorns developing the first year; nut glabrous within.

Leaves deciduous, more or less lobed; trees.

Leaves dark green above; deeply lobed or parted; cups deep; branchlets pendulous.

6. *Q. lobata*.

Leaves blue-green above, shallowly lobed; cups shallow; branchlets not pendulous.

7. *Q. Douglasii*.

Leaves evergreen.

Trees; leaves entire or shallowly lobed, not spinose-toothed.

8. *Q. Engelmanni*.

Shrubs; leaves usually more or less spinose-toothed.

Leaves nearly or quite glabrous above; twigs rusty-pubescent.

Cups saucer-shaped; scales thick and rounded on the back.

9. *Q. dumosa*.

Cup turbinate; scales thin.

10. *Q. turbinella*.

Leaves gray with a stellate-pubescent above; twigs grayish-pubescent.

11. *Q. Alvordiana*.

1. *QUERCUS KELLOGGII* Newb. Pacif. R. Rep. 6: 28, f. 6. 1857.

Quercus tinctoria californica Torr. Pacif. R. Rep. 4: 138. 1857.

Quercus californica Cooper, Smiths. Rep. 261. 1858.

Type locality: "South and north of San Francisco in the Coast Mountains," and "between Fort Redding and Lassen's Butte, on the western slope of the Sierra Nevada."

Distribution: Southern Oregon southward through the Coast Ranges and the Sierra Nevada to San Pedro Martir, Lower California. In southern California the California black oak is confined to the coniferous forests of the mountains, and is a characteristic tree of the Transition Zone.

Specimens examined: Near the summit of Frazier Mountain, *Dudley* 4469; Water Canyon, Tehachapi Mountains, *Abrams* & *McGregor* 480; Rock Creek Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 604; Swartout Valley, San Gabriel Mountains, *Abrams* & *McGregor* 649; Mill Creek Falls, San Bernardino Mountains, *Parish* 5068; Cuimaca Mountains, *Susan G. Stokes*, July, 1895; *Abrams* 3959.

2. QUERCUS WISLIZENI A. DC. Prod. 16, pt. 2: 67. 1864.

Quercus Wislizeni frutescens Engelm. in Bot. Calif. 2: 99. 1880.

Quercus parvula Greene, Pittonia 1: 40. 1887.

Type locality: Originally given as Mexican, but later corrected (Trans. St. Louis. Acad. 3: 396. 1877) to "the American Fork of the Sacramento River," California.

Distribution: Southern slopes of Mount Shasta southward in the Coast Ranges and in the Sierra Nevada to San Pedro Martir Mountain. In southern California it occurs in the upper part of the chaparral belt of all the mountains. The shrubby form is the common type, but occasionally trees 20-25 feet high have been observed (Santa Ana Canyon, San Bernardino Mountains, and Swartout Valley, San Gabriel Mountains). Transition and Upper Sonoran.

Specimens examined; Santa Ynez Mountains, *Franceschi*, 1894; Cuddy's ranch, near Mt. Frazier, *Dudley* 4366; Mount Lowe, *Dudley*, July 20, 1896; Red Reef Canyon, Topatopa Mountains, *Abrams* & *McGregor* 152; Kings Canyon, Liebre Mountains, *Dudley* 4346; Swartout Valley, San Gabriel Mountain, *Abrams* & *McGregor* 661; Lytle Creek Canyon, *Hall* 901; Arrowhead grade, *Shaw and Illingsworth* 16; Santa Ana Canyon, San Bernardino Mountains, *Shaw* & *Illingsworth* 155; Spencer Valley, Cuimaca Mountains, *Abrams* 3875; Cuimaca Peak, *Abrams* 3950; Walker's ranch, near Jacumba Hot Spring, *Abrams* 3697.

3. QUERCUS AGRIFOLIA Nee, Anal. Cienc. Nat. 3: 271. 1801.

Quercus oxyadenia Torr. Sitg. Rep. 172, pl. 17. 1853.

Quercus berberidifolia Liebm. Oversigt Dansk. Vidensk. 1854, 172. 1854.

Quercus arcoglandis Kell. Proc. Calif. Acad. 1: 25. 1855.

Quercus agrifolia frutescens Engelm. Bot. Calif. 2: 98. 1880.

Quercus agrifolia berberifolia Wenzig, Jahrb. Bot. Gart. Berlin 3: 203. 1885.

Type locality: "I have only seen branches collected at Monterey and Nootka, by the marine officer Don Robredo, and Don Manuel Esquerro, paymaster of the corvette *Atrevida*." The above is copied from the translation of Nee's paper in the *Annals of Botany* (2: 106. 1806). The station "Nootka" must be erroneous.

Distribution: Mendocino County southward through the Coast Ranges to Mt. San Pedro Martir, Lower California. In southern California this oak is confined to the coast slope, even becoming very uncommon in the interior valleys. Its most eastern station is in the mountains between Campo and Jacumba Hot Spring, San Diego County. Upper Sonoran.

Specimens examined: Sespe Hot Springs, *Dudley* 4781; Switzer's Camp, San Gabriel Mountains, *Grinnell*, Oct. 8, 1908; near Julian, *Susan G. Stokes*, July, 1895; Alpine, Cuimaca Mountains, *Mearns* 3949, 4014.

Quercus morehus Kell. This oak is apparently a hybrid between *Q. Kelloggii* and *Q. Wislizeni*. It is never found except in the vicinity of these species, and never in large numbers. Two trees have been discovered recently in southern California: between Swartout Valley and Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 666; near Skinner's Camp, Mill Creek, San Bernardino Mountains, *Abrams & McGregor* 819.

4. QUERCUS CHRYSOLEPIS Liebm. Dansk. Vidensk. Forhandl.
1854, 173. 1854.

Quercus fulvescens Kell. Proc. Calif. Acad. 1: 67. 1855.

Quercus crassipocula Torr. Pacif. R. Rep. 4, pt. 1: 137. 1857.

Type locality: "California."

Distribution: Southern Oregon southward through the Coast Ranges and the western slope of the Sierra Nevada to San Pedro Martir Mountain. In southern California the canyon oak occurs in the lower part of the Transition Zone and extends into the Upper Sonoran along the canyons.

Specimens examined: Kings Canyon, Liebre Mountains, *Dudley* 4364, 4430; Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 431; Frazier Mountain, *Dudley* 4541; Mount Wilson trail, San Gabriel Mountains, *Grinnell* 90; Talley's ranch, Cuimaca Mountains, *Susan G. Stokes*, July, 1895.

Quercus tomentella Engelm. Trans. St. Louis Acad. 3: 393. 1877. Foliage resembling that of *Pasania densiflora*; leaves

oblong-ovate strongly nerved and tomentose beneath. Peculiar to the islands off the coast of southern California.

5. *QUERCUS DUNNII* Kell. Pacif. Rural Press. June 7, 1879.

Quercus Palmeri Engelm. in Bot. Calif. 2: 97. 1880.

Quercus chrysolepis Palmeri Engelm. Trans. St. Louis Acad. 3: 383. 1877.

Type locality: Not ascertained.

Distribution: Mountains of southern San Diego County southward into Lower California. This oak has been reported from Vandeventer's ranch, San Jacinto Mountains, otherwise it is known within the state only in the region where it was first discovered, which is a small grove about five miles west of Jacumba Hot Spring (Larken's Station). It probably belongs to the piñon belt of the Upper Sonoran.

Specimens examined: Walker's ranch, near Jacumba Hot Spring, *Abrams 3698*.

6. *QUERCUS LOBATA* Nee, Anal. Nat. 3: 277. 1801.

Quercus Hindsii Benth. Bot. Sulph. 55. 1844.

Quercus lobata Hindsii Wenzig, Jahrb. Bot. Gart. Berlin 3: 188. 1885.

Quercus longiglanda Torr. & Frem. in Frem. Geog. Mem. Upper Calif. 17. 1848.

Type locality: "Of this species I have only seen branches brought from Monterey by Sres. Robredo and Esquerria." The citation given here is copied from a translation of Nee's paper in *Annals of Botany* (2: 111. 1806).

Distribution: Valleys and low hills from the upper Sacramento southward to San Fernando Valley, Los Angeles County. In southern California the roble or valley oak does not occur south of the Santa Monica Mountains except for a single tree near Santa Monica, and another young one near Lamanda Park. North of the Santa Monica Mountains it occurs in the San Fernando, Simi, Santa Clara, and Ojai Valleys. On the desert slopes of the mountains it enters our territory through Tejon Pass and extends along the western border of Antelope Valley to the vicinity of Elizabeth Lake, Liebre Mountains. Upper Sonoran.

Specimens examined: Canyon near Castac Lake, *Dudley 4469*; Soldier's Camp, near Fort Tejon, *Abrams & McGregor 273*; Oak-

grove Canyon, Liebre Mountains, *Abrams & McGregor* 825; Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 492; Chatsworth, *Abrams* 1335.

7. *QUERCUS DOUGLASII* Hook. & Arn. Bot. Beech. 391. 1841.

Quercus Ransomi Kell. Proc. Calif. Acad. 1: 25. 1855.

Quercus oblongifolia brevilobata Torr. Bot. Wilkes Exped. 460. 1874.

Type locality: "California." First collected by Douglas.

Distribution: In the foothills and valleys of the Coast Ranges and Sierra Nevada from Mendocino County and the upper Sacramento Valley to the southern slopes of the Tehachapi Mountains. Upper Sonoran.

Specimens examined: Canyon above Castac Lake, *Dudley* 4470, Lebec Station, near Fort Tejon, *Abrams & McGregor* 285.

8. *QUERCUS ENGELMANNI* Greene, West. Am. Oaks 33, pl. 15, f. 2, 3; pl. 17. 1889.

Quercus MacDonaldi elegantula Greene, W. Am. Oaks, 26, pl. 29. 1890.

Type locality: "Mountains of southern California, from the mesas east of San Diego northward to Kern County."

Distribution: Valleys and low foothills in the vicinity of Pasadena southward through western San Diego County, and probably extending into Lower California. Hybrids between this species and *Q. dumosa* often occur. *Quercus MacDonaldi elegantula* was based upon one of these. Upper Sonoran.

Specimens examined: San Gabriel, *Engelmann*, Sept. 18, 1880; near Pasadena, *Grinnell*, Dec. 1903; Santa Anita, *Grinnell* 126; Sierra Madre, *Abrams* 1490; Fallbrook, *Parish*, Nov. 5, 1891; Potrero, *Orcutt* 2209; Alpine, *Mearns* 3952.

Quercus MacDonaldi Greene, W. Am. Oaks 25. 1889. A species peculiar to Santa Catalina Island. Small tree with foliage much like that of *Q. Douglasii*.

9. *QUERCUS DUMOSA* Nutt. N. Am. Sylva 1: 7. 1842.

Quercus acutidens Torr. Bot. Mex. Bound. 207, pl. 51. 1859.

Quercus dumosa polycarpa Greene, West Am. Oaks pt. 2, pl. 28. 1890.

Type locality: "Entangled thickets over the base of the hills which flank the village of Santa Barbara."

Distribution: Coast Ranges from Lake County southward to northern Lower California, also on the western slope of the Sierra Nevada. In southern California this is the most common shrub in the chaparral belt of the coastal mountains, but less common in the interior. On the desert slopes of the mountains it is seldom met with, being mostly replaced by the next species. As here understood the species has a great number of forms or variations, both in foliage and fruit. Upper Sonoran.

Specimens examined: Mountain Drive, near Santa Barbara, *Abrams* 4108; head of Santa Clara Valley, *Rothrock* 186; Oakgrove Canyon, Liebre Mountains, *Abrams* & *McGregor* 332; Santa Monica Mountains *Hasse*, Dec. 1891; *Abrams* 866, 1285, 1311; Verdugo Hills, *Abrams* 1419, 1420; Arroyo Seco, near Pasadena, *Grinnell*, Dec. 22, 1908; Switzer's Camp, San Gabriel Mountains, *Grinnell*, Oct. 8, 1908; Sawpit Canyon, near Monrovia, *Dudley*, Dec. 27, 1907; San Antonio Canyon, *Baker* 3684; Cajon Pass, *Coville* & *Funston* 115; near Strawberry Valley, San Jacinto Mountains, *Leiberg* 3113; Santa Ana Mountains, near Elsinore, *Abrams*, July 21, 1908; San Joaquin Hills, near Laguna, *Abrams* 1784; San Dieguito (Benardo), *Abrams* 3377; near San Ysabel, *Henshaw* 227; San Diego, *Abrams* 4014.

10. *QUERCUS TURBINELLA* Greene, W. Am. Oaks 37, pl. 27. 1889.

Quercus dumosa turbinella Jepson, Fl. Calif. 356. 1909.

Type locality: "In the mountains of Lower California, where it is associated with the rare and characteristic *Q. dunnii* also within the borders of the State of California about Campo, in San Diego County."

Distribution: Inner South Coast Range from the Rancho Cautera southward to Frazier Mountain according to Jepson. I have seen no specimens of this species except from the vicinity of Campo, where it is very common in the chaparral-covered mountains which form the divide between the coast slope and the Colorado Desert. Upper Sonoran.

Specimens examined: Near Campo, *Abrams* 3552, 3553; *Meikle*, Nov. 1903.

II. *QUERCUS ALVORDIANA* Eastwood, Handb. Trees Calif. 48, pl. 27, fig. 4. 1905.

Type locality: "In the mountains connecting the Coast Range with the Sierra Nevada at the southern end of the San Joaquin Valley bordering the deserts."

Distribution: Desert slopes of the southern California mountains, extending from the Tehachapi Mountains southward into Lower California. This species may be only a form of *Q. pungens* to which it is certainly very closely related. Upper Sonoran.

Specimens examined: Frazier Borax Mine, Mount Pinos, *Abrams* & *McGregor* 266; Oriflamme Canyon, Cuiamaca Mountains, *Abrams* 3935.

3. *CASTANOPSIS*. CHINQUAPIN.

I. *CASTANOPSIS SEMPERVIRENS* (Kell.) Dudley; Merriam, N. Am. Fauna, no. 16: 142. 1899.

Castanea sempervirens Kell. Proc. Calif. Acad. 1: 75. 1855.

Type locality: "From the vicinity of Mariposa."

Distribution: Southern Cascade Mountains southward through the Sierra Nevada and the mountains of southern California, to the San Jacinto Mountains. In southern California it occupies a comparatively distinct belt in the border line between the Transition and Canadian Zones.

Specimens examined: North Baldy, *Abrams* & *McGregor* 607; Mount San Antonio, *Abrams* 2712; Mount San Gorgonio, altitude 3200 meters, *Abrams* & *McGregor* 759.

POLYGONACEAE. BUCKWHEAT FAMILY.

I. *ERIOGONUM*. WILD BUCKWHEAT.

Involucres capitate or fascicled, in cymose-umbellate clusters; bracts foliaceous.

Leaves orbicular to oblong, not fascicled.

Peduncles elongated; flowers very villous.

1. *E. cinereum*.

Peduncles short; flowers glabrous. 2. *E. parvifolium*.

Leaves narrowly oblanceolate, often revolute, more or less fascicled.

Perianth glabrous without; leaves nearly so.

3. *E. fasciculatum*.

Perianth villous without.

Leaves green and nearly glabrous above; involucres 3 mm. high.

3a. *E. fasciculatum foliolosum*.

Leaves hoary-tomentose above; involucre 4-5 mm. high.

3b. *E. fasciculatum polifolium*.

Involucres solitary, sessile along the branches; bracts not foliaceous.

Involucres tomentose.

Inflorescence virgately branched; branches slender becoming more or less denuded of tomentum. 4. *E. tarifolium*.

Inflorescence with spreading, stout branches, permanently and densely white-tomentose. 5. *E. nodosum*.

Involucres glabrous or nearly so; inflorescence intricately branched.

Leaves densely tomentose; involucre teeth villous on the margins.

6. *E. Plumatiella*.

Leaves glabrate; involucre teeth glabrous.

7. *E. Heermannii*.

1. *ERIOGONUM CINEREUM* Benth. Bot. Sulph. 45. 1844.

Type locality: "San Pedro."

Distribution: Bluffs along the seashore and in the coastal foothills of southern California from the vicinity of Santa Barbara to San Pedro. Upper Sonoran.

Specimens examined: Ventura, *Hasse*, Sept. 15, 1888; Santa Monica, *Hasse*, Sept. 1889; S. B. & W. F. *Parish*, 1882; *Abrams* 2193.

2. *ERIOGONUM PARVIFOLIUM* Smith in Rees. Cycl. 13. 1819.

Type locality: "California." First collected by Menzies, probably at Monterey.

Distribution: Seashore of California from Monterey to San Diego County. A common shrub on the sand-dunes. Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer* 3908, 4013; *Abrams* 4162; Santa Monica, *Hasse*, 1894; Playa del Rey (Ballona Harbor), *Abrams* 212; Oceanside, *Parish* 4446.

3. *ERIOGONUM FASCICULATUM* Benth. Trans. Linn. Soc. 17: 411. 1838.

Eriogonum rosmarinifolium Nutt. Journ. Acad. Philad. II. 1: 164. 1847.

Eriogonum fasciculatum aspalathoides Gdgr. Bull. Soc. Bot. Belg. 42: 189. 1906.

Eriogonum fasciculatum maritimum Parish, *Muhlenbergia* 3: 59. 1907.

Type locality: "California."

Distribution: Santa Barbara southward to northern Lower California. Apparently most abundant about San Diego. Throughout the greater part of the coastal slope of southern California the typical form is replaced by the next. Upper and Lower Sonoran.

Specimens examined: Chollas Valley, *Susan G. Stokes*, July 21, 1901; Dulzura, *Susan G. Stokes*, July 17, 1901; San Diego, *Herre*, July 5, 1902; Tia Juana, *Abrams 3519*.

3a. *Eriogonum fasciculatum foliolosum* (Nutt.) Stokes.

Eriogonum rosmarinifolium foliolosum Nutt. Journ. Acad. Philad. II. 1: 164. 1847.

Type locality: "Near Santa Barbara Upper California."

Distribution: A very common shrub in the lower altitudes of the chaparral belt on the coastal slope, extending from the vicinity of Santa Barbara to Lower California. Upper and Lower Sonoran.

Specimens examined: Mountain Drive, near Santa Barbara, *Abrams 4126*; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor 389* ("Growing with the variety *polifolium* and apparently not intergrading"); Pasadena, *Jones 3019*; Sierra Madre, *Abrams 2643*; San Gabriel Canyon, *Abrams 1048*; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor 679* (intermediate between this variety and the next); vicinity of San Bernardino, *Parish 538*; Banning, *Toumy*, Sept. 27, 1894; Santiago Canyon, Santa Ana Mountains, *Helen D. Geis 524*; Elsinore, *Mrs. J. D. Abrams*, May, 1901.

3b. *ERIOGONUM FASCICULATUM POLIFOLIUM* (Benth.) Torr. & Gray, Proc. Am. Acad. 8: 169. 1870.

Eriogonum polifolium Benth. in DC. Prod. 14: 12. 1857.

Type locality: "In Sierra Nevada, California (Fremont), and San Diego (Parry)."

Distribution: On the desert slopes of all the mountains of Southern California mostly within the piñon belt, and occasionally occurring in the more arid interior parts of the coast slope. Upper and Lower Sonoran.

Specimens examined: Vicinity of Fort Tejon, *Abrams & McGregor 291*; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor 134*; Willow Springs, Mohave Desert, *Abrams & McGregor 420*; Oakgrove Canyon, Liebre Mountains, *Abrams &*

McGregor 324; Rock Creek, desert slope of the San Gabriel Mountains, *Abrams & McGregor 549*.

4. *ERIOGONUM TAXIFOLIUM* Greene, *Pittonia* 1: 267. 1889.

Eriogonum Wrightii taxifolium Parish, *Erythea* 6: 87. 1898.

Type locality: Cedros Island, "from a canyon on the eastern side, four miles below the northern end."

Distribution: San Jacinto Mountains southward to Cedros Island. Upper and Lower Sonoran.

Specimens examined: Cuernavaca Mountains, *Parry* 1850; *Allen*, 1897; *Miss Stokes*, Aug. 4, 1899; Jacumba Hot Spring (Larkens), *Palmer 343*; near Warner ranch, *Hayes*, Oct. 10, 1858; open pine forests in the vicinity of Strawberry Valley, San Jacinto Mountains, altitude 1700-2000 meters, *Hall 2608*; Hemet Valley, *Hall 755*.

5. *ERIOGONUM NODOSUM* Small, *Bull. Torr. Bot. Club* 25: 48. 1898.

Type locality: "In dry soil, Don Cabañas, California."

Distribution: A desert species, known only from the original collection. Lower Sonoran.

6. *ERIOGONUM PLUMATELLA* Dur. & Hilg. *Pacif. R. Rep.* 5: 14, *pl.* 16. 1855.

Eriogonum Palmeri S. Wats. *Proc. Am. Acad.* 12: 267. 1877.

Type locality: "Posa Creek," Kern County, California.

Distribution: Mohave Desert of southern California eastward to southern Utah. In southern California this species is characteristic of the yucca belt. Lower Sonoran.

Specimens examined: Desert slope of the Tehachapi Mountains between Tehachapi and Mohave, *Abrams & McGregor 497*; Palmdale, *Abrams & McGregor 515*; Rock Creek, edge of Mohave Desert, *Davidson*, Aug. 1, 1901; Mohave River, near the Hesperia, *Abrams 2165*.

7. *ERIOGONUM HEERMANNI* Dur. & Hilg. *Pacif. R. Rep.* 5: 14, *pl.* 17. 1855.

Type locality: "Rose Creek," California.

Distribution: Western Nevada southward through the Piñon belt to Mount Pinos. Upper Sonoran.

Specimens examined: Frazier Borax Mine, Mount Pinos, altitude 1600 meters, *Abrams & McGregor 267*.

CHENOPODIACEAE. GOOSEFOOT FAMILY.

Flowers unisexual.

Staminate flowers with 3-5-cleft perianth; pistillate flowers without perianth, enclosed in a pair of more or less united bracts.

Bracts compressed.

1. *Atriplex*.

Bracts obcompressed.

Pericarp glabrous, winged.

2. *Grayia*.

Pericarp hairy, not winged.

3. *Eurotia*.

Staminate flowers without perianth; pistillate with a saccate perianth.

6. *Sarcobatus*.

Flowers perfect.

Leaves none; flowers immersed in the fleshy stems.

4. *Allenrolfea*.

Leaves terete; flowers not immersed in the stems.

5. *Dondia*.

I. ATRIPLEX. SALT-BUSH.

Fruiting bracts without lateral wings.

Fruiting bracts without free diverging margins; leaves petioled.

Branches terete, flexuous (or slightly spinescent in no. 1).

Calyx-segments 5; bracts obscurely crenate. 1. *A. lentiformis*.

Calyx-segments 4; bracts entire.

2. *A. Breweri*.

Branches distinctly angled, the ultimate divaricate and spinescent; bracts denticulate.

3. *A. Torreyi*.

Fruiting bracts with free diverging margins.

Margins of bracts toothed, sides muricate.

4. *A. polycarpa*.

Margins of bracts entire, sides not muricate.

Leaves entire, sessile or nearly so.

Fruiting bracts 6-10 mm. long; leaves cuneate at base.

5. *A. confertifolia*.

Fruiting bracts 3 mm. long; leaves cordate at base.

6. *A. Parryi*.

Leaves coarsely toothed.

7. *A. hymenelytra*.

Fruiting bracts with 4 broadly dilated lateral wings.

8. *A. canescens*.

I. ATRIPLEX LENTIFORMIS (Torr.) S. Wats. Proc. Am. Acad. 9: 118. 1874.

Obione lentiformis Torr. Sitg. Rep. 169, pl. 14. 1854.

Type locality: "On the Colorado of California."

Distribution: Upper San Joaquin Valley southward through the deserts of southern California, and Arizona to adjacent Mexico.

Growing in heavy alkaline soil. Lower Sonoran.

Specimens examined: Imperial Valley, near Calexico, G. D. Abrams, Sept. 1902; Mountain Spring, Palmer 328.

2. *ATRIPLEX BREWERI* S. Wats. Proc. Am. Acad. 9: 119. 1874.

Atriplex orbicularis S. Wats. Proc. Am. Acad. 17: 377. 1882.

Type locality: "On the seashore at Santa Monica (Brewer) and Santa Barbara, Torrey."

Distribution: Bluffs and low places, especially in clay soil, along the seashore from Santa Barbara to northern San Diego County. Upper Sonoran.

Specimens examined: Santa Barbara *Torrey* 459; *Elmer* 4016; Ventura, *Hasse* 4193; Santa Monica, *Brewer*, Dec. 1860, *Abrams* 2189.

3. *ATRIPLEX TORREYI* S. Wats. Proc. Am. Acad. 9: 119. 1874.

Obione Torreyi S. Wats. Bot. King Exped. 290. 1871.

Type locality: "In dry valleys bordering the Truckee and Carson Rivers," Nevada.

Distribution: Western Nevada and southern Utah to Antelope Valley, Mohave Desert, where it is common about Lancaster and Willow Springs. Lower Sonoran.

Specimens examined: Lancaster, *Wells*, Dec. 1909.

3. *ATRIPLEX POLYCARPA* (Torr.) S. Wats. Proc. Am. Acad. 9: 117. 1874.

Obione polycarpa Torr. Pacif. R. Rep. 4: 130. 1857.

Type locality: "Hills and gravelly places, on William's River."

Distribution: Deserts of southern California eastward to Arizona. Lower Sonoran.

Specimens examined: Colorado Desert, *Pringle*, Oct. 24, 1882; *Emory*, Oct. 28, 1846.

4. *ATRIPLEX CONFERTIFOLIA* (Torr. & Frem.) S. Wats. Proc. Am. Acad. 17: 119. 1874.

Obione confertifolia Torr. & Frem. Second Rep. 318. 1845.

Obione spinosa Moq. in DC. Prod. 13, pt. 2: 108. 1849.

Atriplex spinosa Dietrich, Syn. Pl. 5: 536. 1852.

Type locality: "On the borders of the Great Salt Lake."

Distribution: Southern Idaho and Wyoming south to New Mexico and northern Mexico, and eastward to the deserts of southern California. Growing in alkaline soil. Lower Sonoran.

Specimens examined: Lancaster, *Elmer* 3691; *Abrams* & *McGregor* 511, Willow Springs, *Abrams* & *McGregor* 416.

5. *ATRIPLEX PARRYI* S. Wats. Proc. Am. Acad. 17: 378. 1882.

Type locality: "Near Colton, California." Parish (Zoe 5: 113) states that "Dr. Parry's plant was collected at Lancaster, in the Mohave Desert."

Distribution: Mohave Desert, southern California. Lower Sonoran.

Specimens examined: Lancaster, *Elmer* 3640; *Wells*, Dec. 1909.

6. *ATRIPLEX HYMENELYTRA* (Torr.) S. Wats. Proc. Am. Acad. 9: 119. 1874.

Obione hymenelytra Torr. Pacif. R. Rep. 4: 129, pl. 20. 1857.

Type locality: "Hills and gravelly places, on Williams River."

Distribution: Southern Utah and Arizona westward to the desert slopes of the mountains of southern California. Growing in dry gravelly washes. Lower Sonoran.

Specimens examined: Near Bennett Wells, Death Valley, *Coville & Funston* 195; Signal Mountain, Colorado Desert, *Abrams*, Dec. 29, 1907; eastern slope of the Cuimaca Mountains, *Emory* Nov. 28, 1846; near Mammoth Tank, *Parish*, Dec. 10, 1881.

7. *ATRIPLEX CANESCENS* (Pursh) Nutt. Gen. N. Am. Pl. 1: 197. 1818.

Calligonum canescens Pursh, Fl. Am. Sept. 2: 370. 1814.

Obione tetraptera Benth. Bot. Sulph. 48. 1844.

Type locality: "In the planes of the Missouri, near the Big-bend."

Distribution: Nevada and Colorado southward to New Mexico and Arizona, and westward to southern California, where it is especially common in the deserts. On the coast slope it occurs rather locally in the interior valleys toward the deserts, and in the vicinity of San Diego, mostly in dry subsaline places. Upper and Lower Sonoran.

Specimens examined: Ten Sycamore Flat, Sespe Creek, *Abrams & McGregor* 167; Lancaster, *Elmer* 3647; between Glendale and Burbank, *Braunton* 906; Cushenberry Spring, *Abrams* 2150; San Bernardino, *Parish*, May, 1900; near Redlands, *G. R. Hall*, 1904; San Jacinto Valley, *Hall* 2003; Encinitas, *McClatchie*, June, 1896; La Jolla, *Abrams* 4012; San Diego, *Parry*, 1850; *Palmer* 327; Calexico, *G. D. Abrams*, Sept., 1902.

2. GRAYIA.

1. GRAYIA SPINOSA (Hook.) Moq. in DC. Prod. 13, pt. 2: 119. 1849.

Chenopodium spinosum Hook. Fl. Bor. Am. 2: 127. 1838.

Grayia polygaloides Hook. & Arn. Bot. Beechy 388. 1841.

Type locality: "Interior of California, Nov. 1826; Mr. Douglas Snake country, Mr. Tolmie."

Distribution: Eastern Washington and Wyoming southward through the Great Basin to the Mohave Desert of southern California. Lower Sonoran.

Specimens examined: Near Willow Springs, *Abrams & McGregor* 826; Palmdale, *Elmer* 3613.

3. EUROTIA.

1. EUROTIA LANATA (Pursh) Moq. Chenop. Mon. Enum. 81. 1840.

Diotis lanata Pursh, Fl. Am. Sept. 2: 602. 1814.

Type locality: "On the banks of the Missouri in open prairies."

Distribution: Eastern Washington and the Saskatchewan southward to New Mexico and southern California, where it is confined to the desert districts. Lower Sonoran.

Specimens examined: Desert slopes of the Tehachapi Mountains, near Willow Springs, *Abrams & McGregor* 427; Palmdale, *Elmer* 3677; *Abrams & McGregor* 512; near Barstow, *Hall* 6164.

4. ALLENROLFEA.

1. ALLENROLFEA OCCIDENTALIS (S. Wats.) Kuntze, Rev. Gen. Pl. 2: 546. 1891.

Halostachys occidentalis S. Wats. Bot. King Exped. 5: 293. 1871.

Spirostachys occidentalis S. Wats. Proc. Am. Acad. 11: 125. 1874.

Type locality: "About Great Salt Lake and in alkaline valleys westward to the sinks of the Carson and Humboldt Rivers, where it grows luxuriantly in large tracts that would be otherwise destitute of vegetation."

Distribution: Great Basin southward to western Texas and New Mexico and westward to California. In California this species occurs in very strong alkaline or saline places from Liver-

more southward through the upper San Joaquin Valley and the deserts of southern California.

Specimens examined: Near Lancaster, *Abrams & McGregor 521*.

5. DONDIA.

1. *DONDIA SUFFRUTESCENS* (S. Wats.) Heller, Cat. N. Am. Pl. 3. 1898.

Suaeda suffrutescens S. Wats. Proc. Am. Acad. 9: 88. 1874.

Type locality: "Western Texas to southern California and northern Mexico, in saline plains."

Distribution: Saline soils along the coast of southern California, eastward to western Texas. Very common in the Colorado Desert. Upper and Lower Sonoran.

Specimens examined: Long Beach, *McClatchie*, May 30, 1891; Chula Vista, *Abrams 4191*; North Island, Coronado, *Chandler 5185*.

6. SARCOBATUS.

Leaves glabrous or nearly so; body of fruit 8-9 mm. long. 1. *S. vermiculatus*.

Leaves pubescent with branched reflexed hairs; body of fruit 4-5 mm. long.

2. *S. Baileyi*.

1. *SARCOBATUS VERMICULATUS* (Hook.) Torr. in Emory, Notes Mil. Reconnois. 150. 1848.

Batis vermiculata Hook. Fl. Bor. Am. 2: 12. 1838.

Fremontia vermicularis Torr. in Frem. First Rep. 95. 1843.

Type locality: "Common on the barren grounds of the Columbia and particularly near salt marshes." First collected by Douglas.

Distribution: Alkaline places in eastern Washington and Oregon, and southward through the Great Basin to Arizona and the eastern parts of California. I have not seen any specimens of this species from our range, but it is common east of the Sierra Nevada about Owens Lake. Upper and Lower Sonoran.

2. *SARCOBATUS BAILEYI* Coville, Contr. Nat. Herb. 4: 184. 1893.

Type locality: "In the valley near Thorpe's quartz-mill, Nye County, Nevada."

Distribution: Western Nevada and extending into the borders of California in Inyo and Mono Counties, according to Coville. This species has not been collected within our limits, but it may

be expected along our northern borders in the Mohave Desert. Lower Sonoran.

RANUNCULACEAE. BUTTERCUP FAMILY.

1. CLEMATIS. CLEMATIS.

Ovaries and achenes pubescent.

Leaflets 5; sepals thin, 7-10 mm. long.

Leaflets 3; sepals thick, 12-18 mm. long.

Ovaries and achenes glabrous.

1. *C. ligusticifolia californica*.

2. *C. lariantha*.

3. *C. pauciflora*.

1. CLEMATIS LIGUSTICIFOLIA CALIFORNICA S. Wats. Bot. Calif.

1: 3. 1876.

Type locality: "San Diego to the Sacramento and to Arizona."

Distribution: Central California southward to the southern boundary of the State. In southern California it is found along streams in the valleys and foothills. Upper and Lower Sonoran.

Specimens examined: Santa Barbara, *Bingham*; *Abrams* 4157; San Gabriel Mountains, *McClatchie*, Aug. 1895; Monrovia Canyon, *Dudley*, Nov. 20, 1907; San Antonio Canyon, *Baker* 3438; Los Angeles, *Abrams* 4168; Lytle Creek Canyon, *Abrams* 1916; San Bernardino, *Parish*; Jamul Valley, *Susan G. Stokes*, June 19, 1895; Cajon Pass, *Abrams & McGregor* 837.

2. CLEMATIS LASIANTHA Nutt. in Torr. & Gray, Fl. N. Am. 1:

9. 1838.

Type locality: "Near the sea-coast of St. Diego."

Distribution: Central California south to the southern boundary of the State. In southern California this is the most common clematis. It is frequent in the chaparral on the coast slope of all the mountains and foothills. Upper Sonoran and extending into the upper parts of the Lower Sonoran of the coastal slope.

Specimens examined: Santa Barbara, *Nuttall*; *Elmer* 3844; Montecito, *Franceschi*, 1894; Sulphur Mountain, Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 128; Santa Monica Mountains, *Abrams* 1306; Mount Wilson trail, *Abrams* 2610; Cañon Diablo, *Parish* 4709; Mill Creek, *Parish*, June, 1898.

3. CLEMATIS PAUCIFLORA Nutt. in Torr. & Gray, Fl. N. Am.

1: 9. 1838 & 1: 657. 1840.

Type locality: "Near the sea-coast of St. Diego."

Distribution: Santa Barbara County southward to northern Lower California. In southern California this species is almost wholly restricted to San Diego County, where it is the common clematis. Upper and Lower Sonoran.

Specimens examined: Santa Barbara, *Elmer* 3906; near San Bernardino, *Parish* 3626; Whitewater, *Vasey*, Feb. 1881; San Diego, *Nuttall*; *Abrams* 3428; Foster, *Chandler* 5033; Point Loma, *Chandler* 5088; Campo, *Abrams* 3612; Hill Valley, between Campo and Jacumba Hot Spring, *Abrams* 3736, San Ysabel, *Henshaw* 61.

BERBERIDACEAE. BARBERRY FAMILY.

1. ODOSTEMON. OREGON GRAPE.

Leaflets 3-7, 15 mm. wide or less, very pale; racemes loosely 5-7-flowered.

Leaflets 15-25 mm. long; spinose teeth 2-4 on a side, stout.

1. *O. Fremontii*.

Leaflets oblong-lanceolate, 15-35 mm. long, spinulose-serrate; teeth slender, numerous.

2. *O. Nevinii*.

Leaflets 5-9, 20-30 mm. broad; racemes many-flowered.

Leaflets green above, scarcely paler beneath, rather thin, spinose teeth 6-10 on a side.

3. *O. fascicularis*.

Leaflets much paler beneath, prominently reticulate-veined, thick and undulate; spinose teeth usually 4-6 on a side.

4. *O. dictyota*.

1. ODOSTEMON FREMONTII (Torr.) Rydb. Bull. Torr. Bot. Club 33: 141. 1906.

Berberis Fremontii Torr. Bot. Mex. Bound. 30. 1859.

Mahonia Fremontii Fedde, Engl. Bot. Jahrb. 31: 98. 1901.

Type locality: "On the tributaries of the Rio Virgen, in southern Utah."

Distribution: Southern Utah and Nevada southward to Arizona, also in southern California and northern Lower California. In southern California this species has only been collected near the southern boundary. Upper Sonoran.

Specimens examined: Walker's ranch, near Jacumba Hot Spring, *Abrams* 3693.

2. Odostemon Nevinii (A. Gray).

Berberis Nevinii A. Gray, Syn. Fl. 1, pt. 1: 69. 1895.

Mahonia Nevinii Fedde, Engel. Bot. Jahrb. 31: 102. 1901.

Type locality: "Southern California, near Los Angeles on a sandy plain."

Distribution: A rare species apparently confined to the San Fernando Valley, where it occurs sparingly on the sandy slopes along the eastern edge of the valley. Upper Sonoran.

Specimens examined: "Los Angeles Valley," probably San Fernando Valley, *Nevin*, April, 1882; San Fernando, *Franceschi*, 1893; wash near Garnsey, San Fernando Valley, *Grinnell*, Oct. 31, 1903.

3. *Odostemon fascicularis* (DC.).

Mahonia fascicularis DC. Syst. 2: 19. 1821.

Berberis pinnata Lag. Elench. Hort. Madr. 6. 1803, and 14. 1816, nom. nudum.

Berberis pinnata Don, Bot. Reg. 9: pl. 702. 1823. Not H.B.K. 1821.

Berberis fascicularis Sims, Bot. Mag. 50: pl. 2396. 1823.

Mahonia pinnata Fedde, Engl. Bot. Jahrb. 31: 86. 1901.

Type locality: "In Americae borealis ora occidentalis circa Monterey et Nutka (Nee ex Lag.)."

Distribution: Foothills of central California from the vicinity of San Francisco to Monterey. The specimens cited below are doubtfully referred to this species, more complete material may prove them distinct.

Specimens examined: Near Glendale, *Hasse*; canyon near San Rafael, *Hasse* 3762; Switzer's trail, San Gabriel Mountains, *Grinnell*, Oct. 8, 1908.

4. *Odostemon dictyota* (Jepson).

Berberis dictyota Jepson, Bull. Torr. Bot. Club 18: 319. 1891.

Mahonia dictyota Fedde, Engl. Bot. Jahrb. 31: 89. 1901.

Type locality: "Near the rocky summit of South Peak," Marysville Buttes.

Distribution: The dry interior foothills of central California southward to San Diego County. Growing in chaparral but rare and seldom met with. Upper Sonoran.

Specimens examined: Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 667; Palomar Mountain, *Susan G. Stokes*, July, 1895; between Julian and Cuiamaca, *Abrams* 3964.

LAURACEAE. LAUREL FAMILY.**I. UMBELLULARIA. CALIFORNIA LAUREL OR BAY-TREE.****I. UMBELLULARIA CALIFORNICA (Hook. & Arn.) Nutt. N. Am. Sylva 1: 87. 1842.**

Tetranthera californica Hook. & Arn. Bot. Beech. 159. 1833.

Oreodaphne californica Nees, Syst. Laurin. 463. 1836.

Type locality: California, probably in the vicinity of San Francisco or Monterey.

Distribution: Valley of the Rogue River, Oregon, southward through the Coast Ranges and on the western slope of the Sierra Nevada to the mountains of San Diego County. In southern California the laurel is frequent in canyons or on shaded slopes in the upper part of the chaparral belt and in the lower Transition, but is usually reduced to a small tree or arborescent shrub.

Umbellularia is one of the many genera peculiar to the California Sub-area, and is a good example of the uniqueness of the flora.

Specimens examined: Mission Canyon, Santa Barbara, *Abrams*, March 6, 1909; Red Reef Canyon, Topatopa Mountains, *Abrams* & *McGregor* 817; Switzer's Camp, San Gabriel Mountains, *Grinnell*, Oct. 8, 1908; Falls Canyon, San Gabriel Mountains, *Dudley*, Dec. 26, 1907; Little Santa Anita Canyon, *Abrams*, July, 1906; Nobles ranch, between Pine Valley and Laguna, San Diego County, *Mearns* 3958.

PAPAVERACEAE. POPPY FAMILY.

Flowers yellow; leaves more or less serrulate; stigmas 2. 1. *Dendromecon*.

Flowers white and very showy; leaves divided; stigmas several.

2. *Romneya*.

I. DENDROMECON. BUSH POPPY.**I. DENDROMECON RIGIDUM Benth. Trans. Hort. Soc. II. 1: 407. 1834.**

Dendromecon fastigiata Greene, Pittonia 5: 298. 1905.

Dendromecon agnina Greene, Pittonia 5: 299. 1905.

Dendromecon saligna Greene (?), Pittonia 5: 300. 1905.

Dendromecon elliptica Greene, Pittonia 5: 300. 1905.

Dendromecon caesia Greene, Pittonia 5: 303. 1905.

Type locality: California.

Distribution: Coast Ranges or central California and the western slope of the Sierra Nevada, southward through the chaparral belt to northern Lower California. The species proposed by Greene do not seem valid, at least so far as the plants of the mainland are concerned. I have examined critically all the species enumerated above except *D. saligna* with the result that I feel constrained to reduce them to synonymy. There is variation in foliage, but this is often marked in a locality where the character of the soil or moisture vary, and seems to be an ecological variation.

Specimens examined: Santa Ynez Mountains, *Elmer* 3875; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 138; Big Tejunga Wash, *Abrams* 1373; near Elizabeth Lake, *Abrams & McGregor* 401; vicinity of San Bernardino, *Parish* 4835; Claremont, *Baker* 4150, Waterman Canyon, San Bernardino Mountains, *Parish* 3474; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 675; Fallbrook, *Jones* 3103; Soledad Canyon, *Greene*, May 18, 1885; Encinitas, *Brandege*, June, 1887; Jamul Valley, *Palmer* 238; Campo, *Vasey* 18; Jacumba Hot Spring, *Mearns* 3351; Julian, *Susan G. Stokes*, July 26, 1895.

2. ROMNEYA. MATILIJA POPPY.

Sepals glabrous, beaked.

1. *R. Coulteri*.

Sepals hispid, beakless or with an inconspicuous beak.

2. *R. trichocalyx*.

1. ROMNEYA COULTERI Harv. Hook. Lond. Journ. Bot. 4: 75, pl. 3. 1845.

Type locality: "In California boreali."

Distribution: Santa Ana Mountains, southward to northern Lower California. Upper Sonoran.

Specimens examined: Trabuco Canyon, Santa Ana Mountains, *Abrams* 1852; near Corona, *Hall* 1280; Santa Ana Canyon, near Anaheim, *Parish* 393; Temescal, *Parish* 4394. This species and the next are not true shrubs, but the stout stems, which often attain a height of 2 meters, persist for a number of years.

2. ROMNEYA TRICHCALYX Eastw. Proc. Calif. Acad. III. 1: 133, pl. 11, f. 4a, 4c. 1898.

Type locality: The figures "were drawn from fresh specimens [cultivated] in Golden Gate Park," San Francisco.

Distribution: Santa Barbara County southward to northern Lower California. Upper Sonoran.

Specimens examined: Griffens, *Elmer* 3876; Ten Sycamore Flat, Sespe Creek, *Abrams & McGregor* 137; Haven's ranch, near El Nido, *Abrams* 3544.

BRASSICACEAE. MUSTARD FAMILY.

1. LEPIDIUM. PEPPERGRASS.

1. *LEPIDIUM FREMONTII* S. Wats. Bot. King. Exped. 30, *pl.* 4, *f.* 3, 4. 1871.

Type locality: "Gathered by Fremont on the Mohave River in 1844, and now collected on sandy foothills near Humboldt Sink."

Distribution: Nevada and Utah south to Arizona and the Mohave Desert of southern California, where it is common in the juniper belt. Upper and Lower Sonoran.

Specimens examined: Desert slopes of the Tehachapi Mountains, near Willow Springs, *Abrams & McGregor* 415; between Tehachapi and Mohave, *Abrams & McGregor* 502; Randsburg, *Heller* 7679a.

CAPPARIDACEAE. CAPER FAMILY.

1. ISOMERIS. BLADDERPOD.

Capsule strongly inflated.

Capsule attenuate at base.

1. *I. arborea*.

Capsule globose, not attenuate at base.

1a. *I. arborea globosa*.

Capsule scarcely inflated, oblong, attenuate at both ends.

1b. *I. arborea angustata*.

1. *ISOMERIS ARBOREA* Nutt. Torr. & Gray, Fl. N. Am. 1: 124. 1838.

Cleome Isomeris Greene, Pittonia 1: 200. 1888.

Type locality: "St. Diego."

Distribution: Vicinity of Mount Pinos southward, especially on the margins of the deserts, to Lower California. On the coast slope it is common about San Diego and occurs on the bluffs along the sea as far northward as Playa del Rey, near Santa Monica.

Specimens examined: Griffens, Lockwood Valley, *Elmer* 3888; Playa del Rey, *Abrams* 2509; La Jolla, *Chandler* 5002; San Diego, *Dunn*, March 17, 1891; *Susan G. Stokes*, June 4, 1895; *Abrams* 3524.

- 1a. *IOMERIS ARBOREA GLOBOSA* Coville, Proc. Biol. Soc. Wash. 7: 73. 1892.

Isomeris globosa Heller, Muhlenbergia 2: 50. 1905.

Type locality: "On Caliente Creek, a few miles above Caliente, Kern County, California."

Distribution: Upper end of the San Joaquin Valley in the vicinity of Caliente westward to the boundary of San Luis Obispo and Santa Barbara Counties, and also on the Sespe Creek in Ventura County. There is considerable variation of the type form in the vicinity of San Diego, and on the desert slopes the two apparently intergrade.

Specimens examined: Sespe Creek, near Ten Sycamore Flat, *Abrams & McGregor* 177; vicinity of Fort Tejon, *Abrams & McGregor* 289.

- 1b. *ISOMERIS ARBOREA ANGUSTATA* Parish, Muhlenbergia 3: 128. 1907.

Type locality: "About Palm Springs and Whitewater."

Distribution: Mohave and Colorado Deserts also on Cedros Island (*Anthony* 7). Lower Sonoran.

Specimens examined: Desert slope of Tehachapi Pass, *Abrams & McGregor* 504.

HYDRANGEACEAE. HYDRANGEA FAMILY.

1. PHILADELPHUS. SYRINGA.

1. *PHILADELPHUS FUMILUS* Rydb. N. Am. Fl. 22: 173. 1905.

Type locality: "In rocky places, San Jacinto Mountains, southern California, at an altitude of 2500 meters."

Distribution: According to Hall this wild syringa is very common among rocks in the upper parts of the Transition from Lake Surprise to the head of Round Valley, San Jacinto Mountains, and "is most plentiful on ridges overlooking the Colorado Desert at 8000-9000 ft. alt., where the low bushes, covered with profusion of white flowers, are very conspicuous on the rocky walls in August."

Specimens examined: Vicinity of Tamarack Valley, San Jacinto Mountains, *Hall* 2500.

GROSSULARIACEAE. GOOSEBERRY FAMILY.

Pedicels jointed beneath the ovary; nodal spines none or when present hypanthium not apparent. 1. *Ribes*.

Pedicels not jointed; nodal spines present; hypanthium evident.

2. *Grossularia*.

I. RIBES. CURRANT.

Stems armed with spines and bristles; hypanthium saucer-shaped.

1. *R. montigenum*.

Stems without spines or bristles.

Calyx smooth, yellow; leaves involute in bud.

2. *R. gracillimum*.

Calyx pubescent, not yellow; leaves plicate in bud.

Leaves evergreen; holly-like.

3. *R. viburnifolium*.

Leaves deciduous, not holly-like.

Bracts herbaceous, toothed; flowers greenish or pinkish white.

4. *R. cereum*.

Bracts scarious, entire or ciliate.

Style glabrous; ovary with only gland-tipped hairs.

5. *R. nevadense*.

Style villous below; ovary canescent.

Flowers pink or purple, 8-10 mm. long.

6. *R. malvaceum*.

Flowers white or greenish-white, 5-7 mm. long.

7. *R. indecorum*.

I. RIBES MONTIGENUM McClatchie, Erythea 5: 38. 1897.

Ribes lacustre molle A. Gray, Bot. Calif. 1: 206. 1876.

Ribes nubigenum McClatchie, Erythea 2: 80. 1894. Not Philippi, 1857.

Ribes lacustre lentum M. E. Jones, Proc. Calif. Acad. II. 5: 681. 1895.

Ribes molle Howell, Fl. NW. Am. 1: 209. 1898. Not Poepp. 1858.

Ribes lentum Coville & Rose, Proc. Biol. Soc. Wash. 15: 28. 1902.

Type locality: "Summit of Mt. San Antonio, 10,000 ft. altitude, among dry exposed rocks."

Distribution: High mountains of the arid regions from eastern Washington and Montana southward to southern California and New Mexico. Canadian Zone.

Specimens examined: Mount Pinos, *Elmer* 4010; Mount San Antonio, *McClatchie*, Aug. 16, 1893; Mount San Geronio, near the summit, *Abrams* & *McGregor* 746.

2. *RIBES GRACILLIMUM* Coville & Britton, N. Am. Fl. 22: 205. 1908.

Type locality: "Stanford University, California."

Distribution: Foothills of the Coast Ranges and the Sierra Nevada of central California southward to southern California. This species has been referred to *R. aureum* or *R. tenuiflorum* in the California manuals. Upper Sonoran.

Specimens examined: Eaton's Wash, near Sierra Madre, *Abrams* 1491; Glendora, *Baker* 4154.

3. *RIBES VIBURNIFOLIUM* A. Gray, Proc. Am. Acad. 17: 202. 1882.

Type locality: "Northern part of Lower California near All Saints Bay."

Distribution: Islands off the coast of southern California, and on the mainland from the vicinity of Del Mar, San Diego County southward to All Saints Bay, Lower California. Upper and Lower Sonoran.

Specimens examined: Santa Catalina Island, *Miss Merritt*, April, 1894; *Brandegge*, May 12, 1894.

4. *RIBES CEREUM* Dougl. Trans. Hort. Soc. 7: 512. 1830.

Cerophyllum Douglasii Spach, Hist. Veg. 6: 153. 1838.

Ribes balsamiferum Kell. Proc. Calif. Acad. 2: 94. 1861.

Type locality: "On the dry exposed granite rocks or schist, throughout the chain of the river Columbia from Great Falls, 45° 46' 17" N. Lat. to the source of that stream in the Rocky Mountains, 52° 07' 09"."

Distribution: Southern British Columbia southward through the Rocky Mountains and along the Pacific Coast to the higher mountains of southern California. Canadian Zone.

Specimens examined: Mount Pinos, *Elmer* 3987; *Abrams* & *McGregor* 235; North Baldy, San Gabriel Mountains, *Abrams* & *McGregor* 619; near the summit of Mount San Antonio, *Leiberg* 3354; *Abrams* 1937, 2707; Huston Flat, San Bernardino Mountains, *Shaw* & *Illingsworth* 106; Tahquitz Valley, San Jacinto Mountains, *Hall* 2350; San Jacinto Mountains, *Hasse*, July 2, 1892.

5. *RIBES NEVADENSE* Kell. Proc. Calif. Acad. 1: 63. 1855.

Ribes Grantii Heller, Muhlenbergia 4: 27. 1908.

Type locality: No locality given with the original description,

but according to the label on a drawing of this species by Dr. Kellogg it was "from a specimen furnished by Mr. Garvett of Placerville."

Distribution: Southern Cascade Mountains southward through the Transition Zone of the Sierra Nevada to the mountains of southern California. Growing in moist places and along streams.

Specimens examined: Mount Pinos, *Abrams & McGregor 257*; Mount Wilson, *Abrams 2583*; *Grant*, May 17, 1904; Swartout Valley, San Gabriel Mountains, *Abrams & McGregor 651*; Bear Valley, *Parish 3107*; Huston's Flat, San Bernardino Mountains, *Shaw & Illingsworth 106*.

6. *RIBES MALVACEUM* Smith, in Rees Cycl. 30, no. 13. 1815.

Ribes malvaceum viridifolium Abrams, Bull. S. Calif. Acad. 1: 67. 1902.

Ribes viridifolium Heller, Muhlenbergia 1: 77. 1904.

Ribes purpurascens Heller, Muhlenbergia 4: 29. 1908.

Type locality: "Gathered in California by Mr. Menzies."

Distribution: Foothills of the Coast Ranges of central California southward to Lower California. The specimens south of Santa Barbara vary considerably from the typical form and were described (*R. malvaceum viridifolium*) as a variety, a disposition that may prove more logical than the present one which I have adopted from Coville & Britton. Upper Sonoran.

Specimens examined: Mission Canyon, near Santa Barbara, *Abrams*, March 6, 1909; Santa Monica Mountains, *Brewer 69*; *Abrams 1313*; Cahuenga Pass, *Brewer 183*; Mount Wilson, on the Pasadena trail, altitude 1100 meters, *Abrams 1525*; Santa Anita Canyon, San Gabriel Mountains, *Grinnell 103*; City Creek, San Bernardino Mountains, *Parish*, April 14, 1906.

7. *RIBES INDECORUM* Eastwood, Proc. Calif. Acad. III. 2: 243. 1902.

Ribes malvaceum indecorum Jancz. Mem. Soc. Geneve 35: 325. 1907.

Type locality: "At Cajon Heights, near San Diego, California."

Distribution: In the chaparral belt of the mountains of Ventura County southward to the international boundary, and probably extending into adjacent Lower California. Upper Sonoran.

Specimens examined: Sulphur Mountain, near Santa Paula,

Abrams & *McGregor* 35; San Fernando Valley, *Brewer* 200; Arroyo Seco Canyon, San Gabriel Mountains, *Grinnell* 18; *Grant* 793; Claremont, *Baker* 5238; Lone Pine Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 673; Whitewater, *Vasey*, 1881; Toro Mountains, altitude 1300 meters, *Leiberg* 3166; San Ysabel, *Henshaw* 212; Fallbrook, *Jones* 3102; Oriflamme Canyon, Cuimaca Mountains, *Abrams* 3936; Cajon Heights, *Eastwood*, March 14, 1891; Potrero, *Abrams* 3551; Ramona, *Brandege*, March, 1906.

2. GROSSULARIA. GOOSEBERRY.

Flowers 5-merous.

Berry armed with prickles.

Herbage glandular-pubescent; prickles gland-tipped.

1. *G. amara*.

Herbage not glandular-pubescent; prickles stiff, not gland-tipped.

Leaves shiny, minutely and sparsely pubescent; calyx-lobes twice the length of the tube.

2. *G. hesperia*.

Leaves canescent; calyx-lobes equaling the tube.

3. *G. Roexli*.

Berry without prickles, glabrous or pubescent.

Styles glabrous; flowers yellow.

Herbage glandular-pubescent; berries yellow.

4. *G. velutina*.

Herbage puberulent, not glandular; berries red.

5. *G. quercetorum*.

Styles pubescent below; flowers purple.

6. *G. Parishii*.

Flowers 4-merous, bright red and showy.

7. *G. speciosa*.

1. GROSSULARIA AMARA (McClatchie) Coville & Britton, N. Am. Fl. 22: 216. 1908.

Ribes amarum McClatchie, *Erythea* 2: 79. 1894.

Type locality: "Shaded canyons of the San Gabriel Mountains."

Distribution: On shaded canyon slopes in the chaparral belt from the southern Sierra Nevada southward through the mountains of southern California to the San Bernardino Mountains. Upper Sonoran.

Specimens examined: Near Santa Barbara, *Elmer* 3753; *Abrams*, March 6, 1909; San Gabriel Mountains, near Pasadena, *McClatchie*, March, 1896; Millards Canyon, San Gabriel Mountains, *Abrams*, March, 1899; Mount Wilson trail, altitude 700 meters, *Abrams* 1508; Cañon Diablo, San Bernardino Mountains, *Parish*, July, 1901; San Antonio Canyon, San Gabriel Mountains, *Baker* 4064.

2. *GROSSULARIA HESPERIA* (McClatchie) Coville & Britton, N. Am. Fl. 22: 215. 1908.

Ribes hesperium McClatchie, Erythea 2: 79. 1894.

Ribes occidentale hesperium Jancz. Mem. Soc. Geneve 35: 68. 1907.

Type locality: "Common in shaded canyons of the San Gabriel Mountains."

Distribution: In the chaparral belt from the mountains of Ventura County southward to the San Gabriel Mountains.

Specimens examined: Sulphur Mountains Spring, near Santa Paula, *Abrams & McGregor* 8; Santa Monica Mountains, *Brewer* 72; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 250, 319, 2562; Santa Monica Canyon, *Abrams* 1477; San Gabriel Mountains near Pasadena, *McClatchie*, Jan., 1894; Cahuenga Pass, *Brewer* 184; Eaton's Canyon, San Gabriel Mountains, *Braunton* 751; Santa Anita Canyon, *Grinnell* 101.

3. *GROSSULARIA ROEZLI* Regel, Gartenflora 28: 226. 1879.

Ribes amictum Greene, Pittonia 1: 69. 1887.

Ribes aridum Greene, Pittonia 4: 35. 1889.

Ribes Wilsonianum Greene, Erythea 3: 70. 1895.

Type locality: Western North America.

Distribution: Southern Sierra Nevada southward through the mountains of southern California. This species occurs most abundantly in the arid parts of the Transition Zone and in the higher altitudes of the Upper Sonoran in the interior foothills.

Specimens examined: Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 481; Fort Tejon, *Abrams & McGregor* 296; Mount Pinos, *Elmer* 3811; summit of Hines Peak, Topatopa Mountains, *Abrams & McGregor* 79; Mount Gleason, *Elmer* 4249; North Baldy, San Gabriel Mountains, *Abrams & McGregor* 606; Mount San Antonio, *Abrams* 2713; *Leiberg* 3357; Mount Santiago, Santa Ana Mountains, *Abrams* 1833; Middle Peak, Cuiamaca Mountains, *Abrams* 3860; Palomar Mountain, *Parish* 4404.

4. *GROSSULARIA VELUTINA* (Greene) Coville & Britton, N. Am. Fl. 22: 220. 1908.

Ribes leptanthum brachyanthum A. Gray, Bot. Calif. 1: 205. 1876.

Ribes velutinum Greene, Bull. Calif. Acad. 1: 83. 1885.

Ribes brachyanthum Card, Bush Fruits 460. 1898.

Ribes glanduliferum Heller, Muhlenbergia 2: 56. 1905.

Ribes Stanfordii Elmer, Bot. Gaz. 41: 315. 1906.

Type locality: "Open grounds in the northern part of California and the region adjacent."

Distribution: Eastern Oregon and Utah southward to northern Arizona and southern California. Transition.

Specimens examined: Mount Pinos, *Elmer* 3958.

5. *GROSSULARIA QUERCETORUM* (Greene) Coville & Britton, N. Am. Fl. 22: 220. 1908.

Ribes quercetorum Greene, Bull. Calif. Acad. 1: 83. 1885.

Ribes Congdoni Heller, Muhlenbergia 1: 101. 1904.

Ribes leptanthum quercetorum Jancz. Mem. Soc. Geneve 35: 381. 1907.

Type locality: "El Paso de Robles [California]."

Distribution: Southern Monterey County and Mariposa County southward to the Liebre Mountains in Los Angeles County. In southern California this species is confined to the vicinity of Fort Tejon, extending southward on the hills bordering the western part of Antelope Valley to Oakgrove Canyon, Liebre Mountains. Upper Sonoran.

Specimens examined: Fort Tejon, *Abrams & McGregor* 294; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor* 319.

6. *GROSSULARIA PARISHII* (Heller) Coville & Britton, N. Am. Fl. 22: 224. 1908.

Ribes Parishii Heller, Muhlenbergia 1: 134. 1906.

Type locality: "San Bernardino Valley, San Bernardino County, California, altitude 1000 feet."

Distribution: The two stations given below are the only localities where this species has been noted. It is related to *G. divaricatum* which has been reported from Santa Barbara County, but that is less pubescent and has the stamens exceeding instead of equaling the calyx-lobes. Upper Sonoran.

Specimens examined: Oak Knoll, near Pasadena, McClatchie, Feb. 10, 1894; near San Bernardino, *Vasey*, 1881; *Parish* 6001; and April 14, 1906.

7. *GROSSULARIA SPECIOSA* (Pursh) Coville & Britton, N. Am.
Fl. 22: 212. 1908.

Ribes speciosum Pursh, Fl. Am. Sept. 731. 1814.

Robsonia speciosa Spach, Hist. Veg. 6: 181. 1838.

Type locality: "On the north-west coast." First collected by Menzies, probably at Monterey.

Distribution: Foothills of the Coast Ranges from Monterey County south to San Diego. In southern California this species is chiefly confined to the Coastal Sub-district. Upper Sonoran.

Specimens examined: Mission Canyon, Santa Barbara, *Abrams*, March 6, 1909; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2563, 3118; Sherman, *Braunton* 362; Eagle Rock Canyon, near Pasadena, *Braunton* 180; Twin Oaks, *Bailey* 306; Oceanside, *Parish* 4456; San Diego, *Dunn*, March 21, 1891.

PLATANACEAE. PLANE-TREE FAMILY.

I. **PLATANUS. SYCAMORE OR PLANE-TREE.**

I. **PLATANUS RACEMOSA** Nutt. N. Am. Sylva 1: 47. 1842.

Platanus californica Benth. Bot. Sulph. 54. 1844.

Type locality: "A native of Upper California, in the vicinity of Sta. Barbara."

Distribution: From the lower Sacramento Valley and the inner Coast Ranges southward to northern Lower California. In southern California this species is common along streams and on canyon floors in the mountains to altitudes of 600 meters, or occasionally, on the desert slopes, extending to 1200 meters. Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer* 3831; Sulphur Mountain Spring, near Santa Paula, *Abrams* & *McGregor* 61; Ten Sycamore Flat, Sespe Creek, *Abrams* & *McGregor* 165; Rock Creek, desert slopes of the San Gabriel Mountains, *Abrams* & *McGregor* 529; Santa Monica Mountains, *Abrams* 1253; between Los Angeles and Pasadena, *Abrams*, March, 1899; San Gabriel, *Cox*, March 28, 1908; Alpine, *Mearns* 4035; Sweetwater Valley, *Susan G. Stokes*, July, 1895.

CROSSOSOMATACEAE. CROSSOMA FAMILY.

I. **CROSSOSOMA.**

Petals broadly obovate or orbicular-obovate; follicles many-seeded.

1. *C. californicum*.

Petals spatulate to oblong; follicles few-seeded.

2. *C. Bigelovii*.

1. *CROSSOSOMA CALIFORNICUM* Nutt. Jour. Acad. Phila. II. 1: 50.
1848.

Type locality: Santa Catalina Island.

Distribution: This insular species has been found on Santa Catalina, San Clemente, and Guadalupe Islands, but not on the mainland. It is included for comparison and on account of its botanical interest.

2. *CROSSOSOMA BIGELOVII* S. Wats. Proc. Am. Acad. 11: 122.
1876.

Type locality: "In canyons near the south of Bill Williams River, W. Arizona."

Distribution: Northwestern Arizona and adjacent California southward to Lower California. Lower Sonoran.

Specimens examined: White-water S. B. & W. F. Parish 10; no locality, Parry & Lemmon 4; Palm Springs, Parish 4105.

ROSACEAE. ROSE FAMILY.

Carpels becoming drupelets in fruit.

Receptacle conical; stems prickly.

3. *Rubus*.

Receptacle flat; stems not prickly.

4. *Rubacer*.

Carpels becoming dry achenes or 2-seeded follicles.

Hypanthium not fleshy.

Styles elongated and plumose in fruit.

Calyx 5-parted; leaves alternate.

Petals present; flowers showy, terminal on short or elongated peduncles; leaves small, lobed.

Sepals with alternate linear bractlets.

5. *Fallugia*.

Sepals without bractlets.

6. *Cowania*.

Petals none; flowers small, axillary; leaves toothed or entire.

7. *Cerocarpus*.

Calyx 4-parted; leaves opposite.

9. *Coleogyne*.

Styles not becoming long and plumose in fruit; petals present.

Leaves opposite.

1. *Lyonothamnus*.

Leaves alternate.

Flowers paniculate or racemose; leaves simple.

Leaves plain, toothed above the middle.

2. *Sericotheca*.

Leaves terete, rarely obscurely toothed.

8. *Adenostoma*.

Flowers corymbose or solitary.

Leaves 1-5-cleft; flowers solitary. 10. *Kunzia*.

Leaves 3-pinnate; flowers corymbose.

11. *Chamaebatia*.

Hypanthium fleshy, becoming bright-colored and pome-like in fruit.

12. *Rosa*.

1. LYONOTHAMNUS.

1. LYONOTHAMNUS FLORIBUNDUS A. Gray, Proc. Am. Acad. 20: 292. 1885.

Lyonothamnus asplenifolius Greene, Bull. Calif. Acad. 1: 187. 1885.

Type locality: "Santa Catalina Island."

Distribution: This monotypic genus is restricted to the islands off the coast of southern California, where it has been found on Santa Cruz, Santa Catalina, and San Clemente. Although this species has not been found on the mainland it is included on account of its botanical and horticultural interest.

2. SERICOTHECA.

Inflorescence ample, well-compound; leaves 3-6 cm. long. 1. *S. franciscana*.
Inflorescence small and narrow, simple, racemose, or with a few short branches;
leaves 1-1.5 cm. long. 2. *S. concolor*.

1. SERICOTHECA FRANCISCANA Rydb. N. Am. Fl. 22: 262. 1908.

Type locality: "San Leandro, California."

Distribution: Coast Ranges of central California southward to the vicinity of Los Angeles. Humid Transition and Upper Sonoran.

Specimens examined: Griffith Park, near Los Angeles, *Braunton* 462.

2. SERICOTHECA CONCOLOR Rydb. N. Am. Fl. 22: 264. 1908.

Spiraea discolor dumosa S. Wats. Bot. Calif. 1: 170. 1876, in part.

Holodiscus discolor dumosa S. Wats.; Abrams, Fl. Los Angeles 196. 1904.

Type locality: "Mt. Davidson, Nevada."

Distribution: Western Nevada and adjacent California, southward through the higher mountains of southern California. Canadian Zone.

Specimens: Mount Pinos, on the summit, *Abrams & McGregor* 234; Mount San Antonio, near the summit, *Abrams* 1917; Green Valley, San Bernardino Mountains, *Hall* 1311; near the summit of Mount San Gorgonio, *Abrams & McGregor* 756; Tahquitz Valley, San Jacinto Mountains, *Hall* 2465.

3. RUBUS. BRAMBLE.

Drupelets separating from the receptacle in fruit.
Drupelets persistent on the receptacle.

1. *Rubus leucodermis*.
2. *Rubus vitifolius*.

1. RUBUS LEUCODERMIS Dougl.; Hook. Fl. Bor. Am. 1: 178. 1833.

Type locality: "North-West Coast America."

Distribution: British Columbia south to Wyoming and the mountains of southern California. Transition.

Specimens examined: Mount Wilson, *Abrams 2584*; North Baldy, San Gabriel Mountains, *Abrams & McGregor 617*; Mill Creek Falls, *Parish 5046*.

2. RUBUS VITIFOLIUS Cham. & Sch. Linnaea 2: 10. 1827.

Type locality: "Ad San Francisco Californiae reperimus."

Distribution: Coast Ranges of central California south to the southern boundary of the State. Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer 3781*; Sulphur Mountain, *Abrams & McGregor 22*; Pasadena, *Jones, 1882*; Santa Monica Mountains, *Abrams 1309*; Palomar Mountain, altitude 1500 meters, *Susan G. Stokes, July 21, 1895*; San Diego, *Parry, 1850*.

4. RUBACER. THIMBLE BERRY.

1. RUBACER VELUTINUM (Hook. & Arn.) Heller, Muhlenbergia 1: 106. 1904.

Rubus velutinus Hook. & Arn. Bot. Beech. 140. 1832.

Rubus Nutkanus velutinus Brewer, Bot. Calif. 1: 172. 1876.

Type locality: "A native of San Francisco," California.

Distribution: Coast Ranges and the Sierra Nevada south to San Pedro Martir Mountain, Lower California. Transition and Upper Sonoran.

Specimens examined: Fremont's Pass, Santa Ynez Mountains, *Mrs. M. Marshall, July, 1907*; Job's Peak, San Bernardino Mountains, *Parish 2367*; Palomar (Smith) Mountain, *Susan G. Stokes, July 28, 1895*.

5. FALLUGIA.

1. FALLUGIA PARADOXA (Don) Endl.; Torr. Emory, Notes Mil. Reconnois. 140. 1848.

Sieversia paradoxa Don, Trans. Linn. Soc. 14: 576, pl. 22, figs. 7-10. 1825.

Type locality: "In Mexico."

Distribution: Providence Mountains, southeastern California, eastward through southern Utah to western Texas, and south through northern Mexico. Lower Sonoran.

Specimens examined: Providence Mountains, *Cooper*.

6. COWANIA.

1. COWANIA STANSBURIANA Torr. Stansb. Exped. 386. *pl.* 3. 1852.

Type locality: "Stansbury's Island, Salt Lake."

Distribution: Utah and Nevada southward through Arizona and New Mexico. Lower Sonoran. *C. mexicana* Don, of central Mexico, has a shorter, almost campanulate calyx-tube.

Specimens examined: This has been collected by Brandegee in the Providence Mountains, but I have not seen his specimens.

Cowania mexicana dubia Brandegee (*Zoe* 5: 149. 1903) I have not seen. Its flowers are smaller than those of *C. Stansburiana* and the styles are densely covered with short bristle-like hairs instead of plumose.

7. CERCOCARPUS. MOUNTAIN MAHOGANY.

Leaves narrowly lanceolate; margins entire, revolute.

1. *C. ledifolius*.

Leaves obovate to rounded, margins toothed above.

Leaves obovate, pubescent or glabrous beneath.

Calyx tomentose; its teeth broadly triangular.

2. *C. betulaeifolius*.

Calyx glabrous; its teeth nearly subulate.

3. *C. minutiflorus*.

Leaves oval to rounded, densely white downy beneath.

4. *C. Traskiae*.

1. CERCOCARPUS LEDIFOLIUS Nutt. in Torr. & Gray, Fl. N. Am. 1: 427. 1838.

Type locality: "Rocky Mountains, in alpine situation on the summits of the hills of Bear River of Timanagos, near the celebrated 'Lear Springs.'"

Distribution: Southwestern Washington and southern Idaho south to southern California and Arizona. Most frequent in the upper part of the Transition Zone, but sometimes extends to the edges of the Upper Sonoran.

Specimens examined: Mount Pinos, *Elmer* 3974; Mount San Antonio, *Abrams* 1919, 2680; Mill Creek Falls, altitude 1800 meters, *Parish* 5066; North Baldy, San Gabriel Mountains,

Abrams & McGregor 616; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor 663*.

2. *CERCOCARPUS BETULAEFOLIUS* Nutt.; Hook. Ic. Pl. 4: *pl.* 322. 1841.

Cercocarpus betuloides Nutt.; Torr. & Gray, Fl. N. Am. 1: 427. 1840.

Cercocarpus parvifolius glaber S. Wats. Bot. Calif. 1: 175. 1876.

Cercocarpus parvifolius betuloides Sarg. Silva N. Am. 4: 66. 1892.

Distribution: Coast Ranges of central California southward to the mountains of northern Lower California. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall*; *Brandege*, June, 1889; *Elmer 3868*; Mountain Drive, near Santa Barbara, *Abrams 4121*; Sepulveda Canyon, Santa Monica Mountains, *Abrams 3116*; Fort Tejon, *Abrams & McGregor 293*; Topatopa Mountains, *Abrams & McGregor 108*; Oakgrove Canyon, *Abrams & McGregor 325*; Mount Wilson trail, *Abrams 1522*; near Monrovia, *Dudley*, Nov. 18, 1907; Rock Creek, San Gabriel Mountains, *Abrams & McGregor 588*; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor 674*; Cleghorn Canyon, San Bernardino Mountains, *Abrams & McGregor 707*; Mill Creek Canyon, *Abrams & McGregor 820*; Santa Ana Mountains, near Elsinore, *Abrams*, July 21, 1908; near Campo, *Abrams 3611*; Jacumba Hot Spring, *Mearns 3356*.

3. *CERCOCARPUS MINUTIFLORUS* Abrams, Bull. Torr. Bot. Club 37: 149. 1910.

Cercocarpus parvifolius glaber S. Wats. Bot. Calif. 1: 175. 1876, excluding Nuttall's specimen, which is the type.

Cercocarpus betulaeifolius minor Schneider, Handb. Laubholzk. 1: 531. 1905 (?).

Type locality: "On chaparral covered hills near San Dieguito on road to San Diego."

Distribution: On chaparral covered hills and mesas from the vicinity of Escondido, San Diego County, southward and westward to northern Lower California. Upper and Lower Sonoran.

Specimens examined: San Dieguito (Bernardo), *Abrams 3376*.

4. *CERCOCARPUS TRASKIAE* Eastwood, Proc. Calif. Acad. III. 1: 136. 1898.

Type locality: "At the northern part of the island [Santa Catalina] in a volcanic region known as 'Salte Verde.'"

Distribution: This peculiar species has been found only at the type locality. It is included here on account of its botanical interest.

8. ADENOSTOMA. CHAMISE.

Leaves fascicled, channelled on one side.

Leaves linear-subulate, acute, 6-9 mm. long.

Leaves obtuse, 4-6 mm. long.

Leaves not fascicled, narrowly linear, 6-10 mm. long.

1. *A. fasciculatum*.

2. *A. fasciculatum obtusifolium*.

3. *A. sparsifolium*.

1. ADENOSTOMA FASCICULATUM Hook. & Arn. Bot. Beech. 139, pl. 30. 1832.

Type locality: "In sandy plains in the Bay of Monterey."

Distribution: The chamise is one of the most characteristic shrubs of the California chaparral, being confined to the California Sub-area of the Upper Sonoran. In southern California it is much more abundant on foothills bordering the interior valleys, than on the coastal mountains. Over large tracts on the eastern end of the San Gabriel Mountains and on the lower southern slopes of the San Bernardino Mountains it often forms almost pure thickets.

Specimens examined: Montecito, *Franceschi*, 1894; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 140; Mount Wilson, *Grinnell*, June 6, 1903; Little Santa Anita Canyon, *Abrams* 2649; Santa Monica Mountains, *Abrams* 1263; vicinity of San Bernardino, *Parish* 4838; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 665; near Potrero, *Abrams* 3727.

1a. ADENOSTOMA FASCICULATUM OBTUSIFOLIUM S. Wats. Bot. Calif. 1: 184. 1876.

Adenostoma fasciculatum var. β Torr. & Gray, Fl. N. Am. 1: 430. 1840.

Adenostoma brevifolium Nutt.; Torr. & Gray, Fl. N. Am. 1: 430. 1840, as a synonym.

Type locality: "San Diego."

Distribution: Chiefly confined to the vicinity of San Diego, and extending from there southward into Lower California, but what seems to be identical occurs on the desert slopes of the Liebre Mountains. Upper and Lower Sonoran.

Specimens examined: "Upper California," *Nuttall*; San Diego, *Emory*, 1846; *Thurber* 564; *Palmer* 79; Oakgrove Canyon, Liebre Mountains, *Abrams* & *McGregor* 387.

2. *ADENOSTOMA SPARSIFOLIUM* Torr. in *Emory's Notes Mil. Reconnois.* 140. 1848.

Type locality: "Cordilleras of California." Vicinity of Warner's ranch, San Diego County, where it was collected by *Emory*, Dec. 2, 1846.

Distribution: San Jacinto Mountains southward to Lower California. Upper Sonoran.

Specimens examined: Vicinity of Warner's ranch, *Emory*, Dec. 2, 1846; mountains east of San Diego, *Parry*, July, 1850; near Pine Valley, *Orcutt*, August 31, 1883; *Mearns* 3982; exposed south slopes in the vicinity of Chalk Hill, altitude 1440 meters, San Jacinto Mountains, *Hall* 2638; San Felipe, altitude 900 meters, *Susan G. Stokes*, July 25, 1895.

9. COLEOGYNE.

1. *COLEOGYNE RAMOSISSIMA* Torr. *Pl. Frem.* 8, *pl.* 4. 1853.

Type locality: "Sources of the Mohave and Virgin Rivers, tributaries of the Colorado of the West, in the mountains of southern California."

Distribution: Almost throughout the Mohave Desert, eastward to southern Nevada and Arizona. Higher altitudes of the Lower Sonoran, and extending into the Upper Sonoran.

Specimens examined: Ironwood Spring, Colorado Desert, *Bran-degee*, April 7, 1901.

10. KUNZIA.

1. *KUNZIA GLANDULOSA* (Curran) Greene, *Pittonia* 2: 299. 1892.

Purshia glandulosa Curran, *Bull. Calif. Acad.* 1: 153. 1885.

Type locality: "On the Mohave side of Tehachapi Pass."

Distribution: Desert slopes of the mountains bordering the Mojave Desert. Upper Sonoran.

Specimens examined: Rock Creek, *Davidson*, Aug., 1901; *Abrams* & *McGregor* 528; Gold Mountain, San Bernardino Mountains, altitude 2300 meters, *Abrams* 2069; southeastern slope of Mount Pinos, *Abrams* & *McGregor* 259; between Tehachapi and

Willow Springs, *Abrams & McGregor* 426; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 662.

11. CHAMAEBATIA.

1. CHAMAEBATIA AUSTRALIS (Brandege) Abrams, Bull. Torr. Bot. Club 34: 623. 1907.

Chamaebatia foliolosa australis Brandege, Bot. Gaz. 27: 447. 1899.

Type locality: "La Gruella, Lower California," and "Mt. Miguel near San Diego."

Distribution: Mount Miguel, southern San Diego County, southward through the foothills of northern Lower California. Upper Sonoran.

Specimens examined: San Miguel Mountain, *Chandler* 5214.

12. ROSA. ROSE.

Foliage more or less glandular-pubescent or puberulent.

Infrastipular spines present, these and the prickles recurved or reflexed.

Leaflets canescent beneath with a close short-villous pubescence.

1. *R. Aldersoni*.

Leaflets scarcely paler beneath, somewhat glandular-pubescent.

2. *R. californica*.

Infrastipular spines wanting; prickles often numerous, slender and straight.

3. *R. gratissima*.

Foliage glabrous; infrastipular spines wanting; prickles straight.

4. *R. mohavensis*.

1. ROSA ALDERSONI Greene, Pittonia 5: 110. 1903.

Type locality: "Witch Creek, San Diego Co., California."

Distribution: This species is closely related to *R. californica* and may be merely a canescent form of it, but it seems to occupy a more or less distinct geographic area. The plants I have referred to this species grow in the higher parts of the chaparral and in the Transition Zone of the San Bernardino and the Cuernamaca Mountains.

Specimens examined: West Fork of Deep Creek, San Bernardino Mountains, *Abrams & McGregor* 714; Strawberry Peak, San Bernardino Mountains, *Abrams* 2054; Witch Creek, Cuernamaca Mountains, *Alderson*, June, 1894; Pine Valley, *Mearns* 3984.

2. *ROSA CALIFORNICA* Cham. & Sch. *Linnaea* 2: 35. 1827.

Type locality: "San Francisco."

Distribution: In the Coast Ranges and the interior of central California, southward to San Diego and perhaps northern Lower California. In southern California it is the only rose in the valleys and lower foothills of the coastal slope. There is considerable variation in the shape of the leaves and in their serrations. In most of the material examined the hypanthium is globose and glabrous in the flowering stage. Specimens from Oakgrove Canyon, Liebre Mountains, however, have an obovate hypanthium, and others from Red Reef Canyon, Topatopa Mountains, are pubescent on the hypanthium and sepals. Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer* 4195; Fort Tejon, *Abrams & McGregor* 292; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 135; between Oakgrove Canyon and Elizabeth Lake, *Abrams & McGregor* 407; Santa Monica Canyon, *Abrams* 1451; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2539; San Gabriel, *Bigelow*, March, 1853; vicinity of San Bernardino, *Parish* 4191; Lakeside, *Abrams* 3763; near San Diego, *Susan G. Stokes*, June 15, 1895.

3. *ROSA GRATISSIMA* Greene, *Fl. Fran.* 73. 1891.

Type locality: "Borders of wet meadows, and about springy places in the mountains of Kern Co."

Distribution: The Tehachapi Mountains southward along the desert slopes to the San Bernardino Mountains. This species is chiefly confined to the desert slopes of the Transition Zone bordering the piñon belt.

Specimens examined: Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 482; Mount Pinos, *Elmer* 3732; Rock Creek, desert slope of the San Gabriel Mountains, altitude 1800 meters, *Abrams & McGregor* 586; Swartout Canyon, San Gabriel Mountains, *Abrams & McGregor* 652; Bear Valley, San Bernardino Mountains, *Abrams* 2821.

4. *ROSA MOHAVENSIS* Parish, *Bull. S. Calif. Acad.* 1: 87, *pl.* 7. 1902.

Rosa californica glabrata Parish, *Erythra* 6: 88. 1898.

Type locality: "On the desert side of the San Bernardino Mountains, near water, Cushenberry Springs, altitude 400 feet."

Distribution: Mr. Parish reports this species from the desert slope of Mount San Antonio and Rock Creek. It is closely related to *R. gratissima*, of which it may prove to be merely a glabrate form. Upper Sonoran.

Specimens examined: Cushenberry Springs, *Parish 4981*.

MALACEAE. APPLE FAMILY.

Carpels 2, free and separating.

1. *Heteromeles*.

Carpels 5, united and coalescent with the fleshy hypanthium.

2. *Amelanchier*.

I. HETEROMELES. CHRISTMAS BERRY OR TOLLON.

1. *Heteromeles salicifolia* (Presl.).

Photinia salicifolia Presl. Epimel. Bot. 204. 1849.

Crataegus arbutifolia Ait. Hort. Kew. 3: 202. 1811. Not Lam. 1783.

Photinia arbutifolia Lindl. Trans. Linn. Soc. 13: 103. 1821.

Heteromeles arbutifolia Roem. Syn. Monog. 3: 105. 1847.

Heteromeles Fremontiana Dec. Nouv. Ann. Mus. Par. 10: 144. 1874.

Type locality: "Habitat in California ad Monte-rey et ad portum S. Blas Mexico occidentalis."

Distribution: The tollon or christmas berry is characteristic of the California Sub-area. It extends from Mendocino County through the coast ranges and the western slope of the Sierra Nevada to northern Lower California. It also occurs on the islands off the coast of northern California, and on Cedros Island. Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer 3857*; Elizabeth Lake, *Abrams & McGregor 413*; Little Santa Anita Canyon, San Gabriel Mountains, *Abrams 2648*; San Gabriel Canyon, *Abrams* Aug. 10, 1900; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor 676*; Pine Valley, San Diego County, *Mearns 3975*; Jamul Valley, *Susan G. Stokes*, June 19, 1895.

2. AMELANCHIER. SERVICE BERRY.

Sepals erect; leaves cuspidate, entire or inconspicuously serrate at apex.

1. *A. pallida*.

Sepals strongly reflexed; leaves not cuspidate, distinctly serrate above.

Hypanthium and sepals tomentose without.

2. *A. venulosa*.

Hypanthium and sepals glabrous without.

3. *A. recurvata*.

1. *AMELANCHIER PALLIDA* Greene, Fl. Fran. 53. 1891.

Type locality: "Common or dry hills of the northern and north-eastern parts of the State [California]."

Distribution: I have seen no authentic specimens of this species, but the specimens here referred to it answer the description. The distribution, as originally given, is therefore greatly extended. Transition.

Specimens examined: Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 490; Cuimaca Lake, Cuimaca Mountains, *Abrams* 3912.

2. *AMELANCHIER VENULOSA* Greene, Pittonia 4: 21. 1899.

Type locality: "Cushenberry Springs, in Southern California."

Distribution: Apparently confined to the piñon belt and the Transition Zone of the San Gabriel and the San Bernardino Mountains. The specimens from Dry Lake are not typical, and possibly are nearer the Sierra Nevada plant which has recently been named *A. siskiyouensis*.

Specimens examined: Swartout Canyon, San Gabriel Mountains, *Abrams & McGregor* 633; Fawnskin Park, San Bernardino Mountains, *Parish* 4992; Hathaway Flat, San Bernardino Mountains, *Abrams & McGregor* 808; Dry Lake Canyon, San Bernardino Mountains, *Abrams & McGregor* 783.

3. *AMELANCHIER RECURVATA* Abrams, Bull. Torr. Bot. Club 37: 151. 1910.

Type locality: "In moist places in the Topatopa Mountains, altitude 5500 feet, *Abrams & McGregor* 107."

Distribution: Only known from the Topatopa Mountains, but probably occurs elsewhere in the Transition Zone in the mountains of Ventura and Santa Barbara Counties.

AMYGDALACEAE. PEACH FAMILY.

Ovary and fruit glabrous.

Leaves deciduous.

Flowers corymbose or umbellate.

Flowers racemose.

Leaves evergreen.

Ovary and fruit velvety-pubescent.

1. *Cerasus*.

2. *Padus*.

3. *Laurocerasus*.

4. *Amygdalus*.

I. CERASUS. CHERRY.

I. CERASUS ARIDA Greene, Proc. Biol. Soc. Wash. 18: 57. 1905.

Type locality: "Borders of the desert at eastern base of the San Bernardino Mountains."

Distribution: The cherry referred to this species occurs sparingly in the Transition Zone of the San Gabriel, San Bernardino and Cuiamaca Mountains. Considerable variation occurs in the specimens examined, and it is evident that a great deal of field study must be given to the western cherries before they are understood. The specimens from Strawberry Peak have narrow, oblanceolate, acutish leaves, which are pubescent and somewhat glandular on the lower surface. They also differ in their prominent approximate veins.

Specimens examined: Lytle Creek Canyon, altitude 1725 meters, *Hall 1471*; near Strawberry Peak, San Bernardino Mountains, *Abrams & McGregor 727*; South Peak, Cuiamaca Mountains, *Abrams 3943*; Green Valley, San Bernardino Mountains, *Abrams & McGregor 734*; San Jacinto Mountains, *Hasse 5680, 1263*; San Bernardino Mountains, altitude 2180 meters, *Parish 3329*.

2. PADUS. CHOKE CHERRY.

I. PADUS DEMISSA (Nutt.) Roem. Syn. Rosifl. 87. 1847.

Cerasus demissa Nutt. in Torr. & Gray, Fl. N. Am. 1: 411. 1840.

Prunus demissa Walp. Rep. 2: 10. 1843.

Padus virginiana demissa Schneider, Handb. Laubholzk. 1: 642. 1906.

Type locality: "Plains of the Oregon towards the sea, and at the mouth of the Wahlamet."

Distribution: Washington and Idaho to southern California. In southern California there is considerable variation in pubescence. The Cuiamaca specimens are glabrous except for pubescence along the mid-vein, thus approaching very closely *P. melanocarpa* of the Rocky Mountains and Great Basin. Upper Sonoran and Transition.

Specimens examined: Mount San Antonio, altitude 2700 meters, *Abrams 2697*; Swartout Canyon, San Gabriel Mountains, *Hall*, June, 1899; *Abrams & McGregor 639*; North Baldy, San Gabriel Mountains, *Abrams & McGregor 620*; Cuiamaca, *Abrams 3828*; "summit of the cordillaries east of San Diego," *Parry*, June, 1850.

3. LAUROCERASUS. HOLLY-LEAVED CHERRY.

1. LAUROCERASUS ILICIFOLIA (Nutt.) Roem. Syn. Rosifl. 92.
1847.

Cerasus ilicifolia Nutt.; Hook. & Arn. Bot. Beach. Voy. 340.
1832.

Prunus ilicifolia Walp. Rep. 2: 10. 1843.

Type locality: "St. Barbara, California, *Douglas, Nuttall*."

Distribution: Coast Ranges from San Francisco Bay south to the southern borders of the State. In the northern part of its range this species often becomes a good sized tree, but in our region it is usually reduced to a shrub. The holly-leaved cherry is common throughout southern California in the foothills and mountains. Upper Sonoran.

Specimens examined: Santa Barbara, *Douglas; Nuttall*; Santa Ynez Mountains, *Elmer 3775*; Cuddy Canyon, near Tejon Pass, *Abrams & McGregor 282*; Sepulveda Canyon, Santa Monica Mountains, *Abrams 2551*; Mount Lowe, *Grant 1046*; hills near Verdugo, *Abrams 1380*; Reche Canyon, *Hall 1104*; vicinity of San Bernardino, *Parish*, June, 1897, Potrero, *Abrams 3741*; mountains east of San Diego, *Parry 1850*; Jacumba Hot Spring, *Mearns 3354*.

4. AMYGDALUS. ALMOND.

- Leaves narrowly spatulate, entire; styles very short. 1. *A. fasciculata*.
Leaves ovate or nearly round; denticulate; styles elongated. 2. *A. Fremonti*.

1. AMYGDALUS FASCICULATA (Torr.) Greene, Fl. Fran. 49. 1891.

Emplectocladus fasciculatus Torr. Pl. Frem. 10, pl. 5. 1850. *Prunus fasciculata* A. Gray, Proc. Am. Acad. 10: 70. 1874.

Type locality: "Sierra Nevada of California; probably in the southern part of the range."

Distribution: Desert slopes of the San Bernardino Mountains north to the eastern slopes of the southern Sierra Nevada and eastward to southern Utah and Arizona. Canyons and rocky slopes of the juniper belt. Upper and Lower Sonoran.

Specimens examined: Rock Creek, desert slope of the San Gabriel Mountains, *Abrams & McGregor 525*; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor 668*; Cushenberry Spring, *Abrams 2152*; summit of Providence Mountains, *Cooper*, May 29, 1861.

2. *Amygdalus Fremontii* (S. Wats.).

Prunus Fremontii S. Wats. Bot. Calif. 2: 442. 1880.

Type locality: "Coast Ranges of southern California; Ori-flamme Canyon, San Diego County (*D. Cleveland*); San Bernar-dino Mountains, *Parry & Lemmon*, n. 108, 1876. Also collected by *Fremont* in 1846, locality uncertain."

Distribution: Southern slopes of the Chuckawalla Mountains, south to northern Lower California. Lower Sonoran and extend-ing into the lower edges of the Upper Sonoran.

Specimens examined: San Felipe, *Parry*, 1850 (Referred to *Prunus subcordata* by Torr. Bot. Mex. Bound. 63); no locality, *Parry & Lemmon* 108.

MIMOSACEAE. MIMOSA FAMILY.

Stamens numerous; pods flattened, straight or more or less curved.

1. *Acacia*.

Stamens 10.

Pods straight or slightly curved.

2. *Prosopis*.

Pods coiled into a spiral.

3. *Strombocarpus*.

1. ACACIA. ACACIA.

1. ACACIA GREGGII A. Gray, Pl. Wright. 1: 65. 1850.

Type locality: "Western Texas" and "dry valley west of Patos, Northern Mexico."

Distribution: A characteristic shrub of the Lower Sonoran, ex-tending from the western borders of the Colorado Desert in south-ern California eastward to western Texas and southward into Lower California and northern Mexico.

Specimens examined: Banner, *Susan G. Stokes*, July 26, 1895; San Felipe, *Abrams* 3970; Carriso Creek, *Abrams* 3985; Piute Creek, *Norman C. Wilson*, June 6, 1893; near Indio, *Hall* 5987; Jacumba Hot Spring, *Cleveland*, July 3, 1884; Providence Moun-tains, *Brandege*, May 25, 1902.

2. PROSOPIS. MESQUIT.

Leaves glabrous.

1. *P. glandulosa*.

Leaves pubescent.

2. *P. velutina*.

1. PROSOPIS GLANDULOSA Torr. Ann. Lyc. N. Y. 2: 192. 1828.

Prosopis odorata Torr. & Frem. in Frem. Second Rep. 313, pl. 1. 1845, excluding fruit which is *Strombocarpus pubescens*.

Type locality: "On the Canadian? [River]."

Distribution: Deserts of southern California eastward to western Texas, and southward into Lower California and northern Mexico. The *Prosopis juliflora* of the California botanics, but not DC. Lower Sonoran.

Specimens examined: Lancaster, *Elmer* 3726; Cushenberry Springs, *Abrams* 2148; San Bernardino, *Parish* 2928; *Abrams* 2148; San Jacinto Lake, *Hall* 1106; San Felipe, *Susan G. Stokes*, July 25, 1895; San Diego, *Herre*, July 19, 1902.

2. *PROSOPIS VELUTINA* Wooten, Bull. Torrey Club 25: 456. 1898.

Type locality: Several localities were originally cited, but the plants from which the description was drawn were collected by Pringle "in Arizona on mesas and in valleys," and by Wilcox "at Fort Huachuca, Ariz."

Distribution: Southern Arizona southward into adjacent Sonora. A single arborescent shrub, apparently indigenous, was found by the writer on the sandy river bottom of the San Diego River, near Grantville, southwestern San Diego County. Lower Sonoran.

Specimens examined: Grantville, *Abrams* 3753.

3. *STROMBOCARPUS*. SCREW-BEAN.

1. *STROMBOCARPUS PUBESCENS* (Benth.) A. Gray; Torr. Pacif. R. Rep. 5: 360. 1858.

Prosopis pubescens Benth. Lond. Journ. Bot. 5: 82. 1846.

Prosopis Emoryi Torr. in Emory, Notes Mil. Reconnois. 139. 1848.

Prosopis odorata Torr. & Frem. in Frem. Second Rep. 313. 1845, in part.

Type locality: This species is said to have been collected in "California between San Miguel and Monterey," but the species has not since been found in that part of the State. Coulter, the collector, travelled southward from Monterey to Yuma, and it is probable that he obtained his specimens somewhere in the Colorado Desert along the old San Felipe and Yuma trail.

Distribution: From the interior and eastern parts of the Mohave Desert southward into Lower California and Sonora. Lower Sonoran.

Specimens examined: Near San Bernardino, *Parish*, July 8,

1898; *Abrams* 2954; Imperial Valley, near Calexico, *Abrams* 3999.

CAESALPINIACEAE. SENNA FAMILY.

Leaves simple, rounded; flowers resembling the papilionaceous, purple.

1. *Cercis*.

Leaves 1-2-pinnate; flowers regular, yellow.

Pods not compressed, torose, gland on upper petal wanting.

2. *Parkinsonia*.

Pod compressed, only slightly contracted between the seeds; gland on upper petal prominent.

3. *Cercidium*.

1. CERCIS. RED-BUD.

1. *CERCIS OCCIDENTALIS* Torr.; A. Gray, Bost. Journ. Nat. Hist. 6: 177. 1850.

Cercis californica Torr.; Benth. Pl. Hartw. 361. 1857.

Siliquastrum occidentale Greene, Man. Bay Region, 84. 1894.

Type locality: "Rocky plains of the Upper Guadaloupe."

Distribution: Lower edges of the Arid Transition from Sacramento Canyon and Mendocino County southward to the Cuimaca Mountains, also in New Mexico and western Texas.

Specimens examined: Cuimaca Mountains, between Cuimaca and Oriflamme Mines, *Abrams* 3924.

2. PARKINSONIA.

Rachis flattened, much-elongated; leaflets scattered.

1. *P. aculeata*.

Rachis terete; leaflets in distinct pairs.

2. *P. microphylla*.

1. PARKINSONIA ACULEATA L. Sp. Pl. 375. 1753.

Type locality: "Habitat in America calidiore."

Distribution: Valley of the Colorado River, northern Mexico and the lower Rio Grande; naturalized in the West Indies and the tropics of both hemispheres. Lower Sonoran and Tropical.

Specimens examined: I have not seen any specimens from southern California.

2. *PARKINSONIA MICROPHYLLA* Torr. Pacif. R. Rep. 4: 82. 1857.

Type locality: "Banks of the Colorado [where it was collected by Mr. Schott near Fort Yuma] and on Williams River."

Distribution: Deserts of southern Arizona west to the Colorado Desert of southern California, and southward to adjacent Sonora and Lower California. Lower Sonoran.

Specimens examined: Diluvial banks of the Colorado, Ft. Yuma, *Schott*, Jan. 13, 1854.

3. CERCIDIUM. PALO VERDE.

1. CERCIDIUM TORREYANA (S. Wats.) Sargent, Gard. & For. 2: 388. 1889.

Parkinsonia Torreyana S. Wats. Proc. Am. Acad. 11: 135. 1876.

Type locality: "On the Lower Colorado River and in the valleys of western and southern Arizona."

Distribution: Colorado Desert and western Arizona southward into Sonora and Lower California. Lower Sonoran.

Specimens examined: The Needles, *Jones* 3864; Palm Springs, *Parish* 4115; Mecca, *Miss M. McKibben*; Coyote Canyon, *Hall* 2790; Salton, *Davey* 8043.

KRAMERIACEAE. KRAMERIA FAMILY.

1. KRAMERIA.

Prickles of the fruit barbed their whole length.

1. *K. parvifolia*.

Prickles of the fruit barbed only at apex.

2. *K. Grayi*.

1. KRAMERIA PARVIFOLIA Benth. Bot. Voy Sulph. 6, pl. 2. 1844.

Type locality: "Bay of Magdalena," Lower California.

Distribution: Tia Juana southward into Lower California, and eastward to southern New Mexico and adjacent Sonora. Lower Sonoran.

Specimens examined: Rabbit Springs, Mohave Desert, *Parish* 2334; eastern base of San Jacinto Mountains, *Hall* 2114; San Felipe, *Thurber* 632; Jacumba Hot Spring, *Abrams* 3662; Cleveland's specimens from the vicinity of San Diego, which are cited in the "Botany of California," I have not seen.

2. KRAMERIA GRAYI Rose & Painter, Contr. Nat. Herb. 10: 108. 1906.

Krameria canescens A. Gray, Pl. Wright. 1: 42. 1852. Not Willd. 1825.

Type locality: "Prairies near the Pecos."

Distribution: Western borders of the Colorado Desert, southern California, eastward to New Mexico, and southward into adjacent Lower California and Sonora. Lower Sonoran.

Specimens examined: Morongo Canyon, *Parish 2979*; Signal Mountain, *Abrams 3170*, and Dec. 29, 1907; San Felipe, *Parry, 1850*.

FABACEAE. PEA FAMILY.

Leaves palmately foliate.

Flowers solitary.

Flowers racemose.

Leaves unequally or equally pinnate or rarely entire.

Flowers umbellate or solitary.

Flowers in spikes or racemes, not umbellate.

Herbage glandular-dotted.

Flowers racemose; wings and keel wanting.

Flowers spicate or racemose; petals all present.

Herbage not glandular-dotted.

1. *Xylothermia*.

2. *Lupinus*.

3. *Syrmatium*.

4. *Amorpha*.

5. *Parosela*.

6. *Olneya*.

I. XYLOTHERMIA. STINGAREE-BUSH.

Twigs and leaves green and merely puberulent.

1. *X. montana*.

Twigs and leaves canescent.

1a. *X. montana tomentosa*.

1. XYLOTHERMIA MONTANA (Nutt.) Greene, Pittonia 2: 188. 1891.

Pickeringia montana Nutt. in Torr. & Gray, Fl. N. Am. 1: 389.
1840.

Type locality: "Summits of the mountains in the vicinity of St. Barbara, California."

Distribution: Islands off the coast of southern California, and on the mainland in the chaparral of the Coast Ranges from the vicinity of Santa Barbara, northward to Sonoma County, and in the Sierra Nevada at least as far north as Mariposa County. Upper Sonoran.

Specimens examined: Santa Cruz Island, *Brandeggee*; La Cumbre Peak, Santa Ynez Mountains, *Abrams 4320*.

1a. XYLOTHERMIA MONTANA TOMENTOSA Abrams, Bull. Torrey Club 34: 263. 1907.

Type locality: "Near El Nido, San Diego County."

Distribution: In the chaparral from the San Bernardino Mountains southward to near the National Boundary, and probably extending along the western slopes of the mountains of northern Lower California. Upper Sonoran.

Specimens examined: San Bernardino Mountains, altitude 1650 meters, *Parish 4990*; El Nido, *Abrams 3530*.

2. LUPINUS. LUPINE.

Keel ciliate on the inner margin above the middle.

Flowers yellow or sometimes purple; seeds dark brown, not mottled; leaves green, sparsely pubescent. 1. *L. arboreus*.

Flowers purple; seeds mottled; leaves more or less canescent.

Lower calyx-lobe entire; leaflets oblanceolate, acutish, 3-5 cm. long.

Seeds 5 mm. long, dark gray, mottled with dark brown; pubescence of the branches and petioles short-villous, spreading.

2. *L. longifolius*.

Seeds scarcely 4 mm. long, light tan, mottled with dark tan; pubescence of the branches and petioles appressed-silky.

3. *L. Brittoni*.

Lower calyx-lobe 3-toothed; pubescence appressed-silky.

Leaflets spatulate, rounded or very obtuse at apex, longest 2.5 cm. long; bractlets 5-6 mm. long. 4. *L. Hallii*.

Leaflets narrowly oblanceolate, obtuse or acutish, mostly 3-4 cm. long; bractlets 10-12 mm. long. 5. *L. Douglasii*.

Keel glabrous; herbage densely silky-pubescent.

6. *L. Chamissonis*.

1. LUPINUS ARBOREUS Sims, Bot. Mag. 18: pl. 682. 1803.

Type locality: "Its native country is unknown to us." Probably collected at San Francisco or Monterey.

Distribution: Vicinity of the coast from San Francisco south to Santa Barbara. Upper Sonoran.

Specimens examined: Vicinity of Santa Barbara, *Elmer 3843*.

2. LUPINUS LONGIFOLIUS (S. Wats.) Abrams, Fl. Los Angeles, 209. 1904.

Lupinus Chamissonis longifolius S. Wats. Bot. Calif. 1: 117. 1876.

Type locality: "From San Diego (*Cleveland*) to Ojai (*Peckham*), San Pascual (*Thurber*) and San Antonio River, *Brewer*."

Distribution: Slopes of the lower hills in the coastal region of southern California. Upper Sonoran.

Specimens examined: Los Angeles, *Lyon*, April, 1884; Little Santa Anita Canyon, *Abrams 2621*; Playa del Rey, *Abrams 2505*; Santa Monica Forestry Station, *Barber 44*; Santa Monica Mountains, *Abrams 1696*; San Pasqual, *Thurber 615*; San Diego, *Cleveland 720*; hillsides near Ysidora, *Abrams 3299*.

3. *Lupinus Brittoni* sp. nov.

Bushy and shrubby below, with long herbaceous branches, about 1 m. high; herbage appearing glaucescent with a minute appressed pubescence; petioles slender, exceeding the leaflets; leaflets 6-8, oblanceolate, 25-45 mm. long, acutish at apex, with a prominent recurved point; racemes 15-30 cm. long; many-flowered; flowers scattered or in approximate whorls; pedicels 5 mm. long; lower calyx-lobes entire, 7 mm. long; corolla (in dried specimens) 15 mm. long, violet-purple; keel ciliate toward the middle on the upper edges; pod 3 cm. long; seeds 5-6, scarcely 4 mm. long, nearly as wide, light tan, specked with dark tan.

Type collected by the writer (3904) in Cottonwood Valley, San Diego County, June 5, 1903, and deposited in the Herbarium of Stanford University.

The glaucescent instead of silvery herbage, the shorter and closely appressed pubescence of the pedicels and calyx, and the minute pale seeds, separate this species readily from true *L. albi-frons* of central California. The characters given in the key contrast it with the other southern California members of this group.

4. *LUPINUS HALLII* Abrams, Bull. Torr. Bot. Club 37: 151.
1910.

Type locality: "Reche Canyon, altitude 400 meters, San Bernardino Mountains."

Distribution: Foothills of the San Gabriel and the San Bernardino Mountains. Upper Sonoran.

Specimens examined: Reche Canyon, altitude 400 meters, *Hall*, May 15, 1901; vicinity of San Bernardino, *Parish* 4772; Anaheim, *Baker* 4102.

5. *LUPINUS DOUGLASII* Agardh, Syn. Gen. Lupin. 34. 1835.

Type locality: Collected by Douglas, probably near Monterey.

Distribution: Dry hillsides near Monterey southward to the Santa Ynez Mountains. Upper Sonoran.

Specimens examined: Fremont's Pass, Santa Ynez Mountains, *Mrs. Marshall*, July, 1907.

6. *LUPINUS CHAMISSONIS* Esch. Mem. Acad. Petersb. 10: 288.
1826.

Type locality: "in Novae Californiae arenosis." This was probably collected at San Francisco.

Distribution: Along the seashore from San Francisco south to Orange County. Upper Sonoran.

Specimens examined: Playa del Rey, *Abrams* 2502; Santa Monica, *Hasse* 4823; Redondo, *Grant* 724.

3. SYRMATIMUM. CALIFORNIA BROOM.

Herbage nearly glabrous, not silky-pubescent.

Calyx-teeth subulate, about 2 mm. long.

Calyx-teeth very short and triangular.

Herbage appressed silky-pubescent.

1. *S. glabrum*.

2. *S. junceum*.

3. *S. procumbens*.

1. SYRMATIMUM GLABRUM Vogel, *Linnaea* 10: 591. 1836.

Hosackia scoparia Nutt.; Torr. & Gray, *Fl. N. Am.* 1: 325. 1838.

Hosackia glabra Torr. *U. S. Expl. Exped.* 17: 274. 1874.

Lotus glaber Greene, *Pittonia* 2: 148. 1890.

Type locality: "California." Probably collected in the vicinity of the old Russian settlement, near Bodega Bay.

Distribution: Common on dry hillsides and slopes, especially in chaparral, throughout the California Sub-area of the Upper Sonoran, from Mendocino County and the western slopes of the Sierra Nevada southward to northern Lower California.

The species of this genus here included are low broom-like suffrutescent plants, and not true shrubs.

Specimens examined: Santa Barbara, *Elmer* 3881; *Torrey* 105; Sulphur Mountain, near Santa Paula, *Abrams* & *McGregor* 32; Oakgrove Canyon, Liebre Mountains, *Abrams* & *McGregor* 390; Los Angeles, *Tracy* & *Evans*, July 5, 1887; foothills, near San Bernardino, *Parish* 4776, *S. B.* & *W. F. Parish* 146; San Diego, *Nuttall*; *Thurber* 524; *Orcutt*, Feb. 15, 1886; *Palmer* 58; Jacumba Hot Spring, *Abrams* 3652.

2. SYRMATIMUM JUNCEUM (Benth.) Greene, *Bull. Calif. Acad.* 2: 147. 1886.

Hosackia juncea Benth. *Trans. Linn. Soc.* 17: 326. 1837.

Lotus junceus Greene, *Pittonia* 2: 148. 1890.

Type locality: "California." Collected by Douglas, probably in the vicinity of Monterey.

Distribution: A maritime species occurring along the coast from Monterey to San Diego. It is closely related to *S. glabrum*, and

possibly is only a form of that widely distributed and variable species. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall*; Playa del Rey, *Abrams 2518*; Del Mar, *Brandegee*, June 4, —; San Diego, *Susan G. Stokes*, June 4, 1895; Tia Juana, *Abrams 3469*.

3. *SYRMATIMUM PROCUMBENS* Greene, Bull. Calif. Acad. 2: 148. 1886.

Hosackia procumbens Greene, Bull. Calif. Acad. 1: 82. 1885.

Lotus procumbens Greene, Pittonia 2: 149. 1890.

Type locality: "Tehachapi, Kern County."

Distribution: This species is confined chiefly to the piñon belt of the mountains surrounding the western end of the Mohave Desert. The original specimens from Tehachapi were described as prostrate, but in the Liebre Mountains the plants are erect. The species is undoubtedly closely related to *S. sericeum*, and probably will prove identical when that species becomes better known. Upper Sonoran.

Specimens examined: Tehachapi, *Brandegee*, May, 1889; Mount Pinos, *Elmer 3988*; near Lancaster, *Davidson*, May 10, 1893; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor 337*; Swartout Canyon, San Gabriel Mountains, *Hall 1254*; Burcham's ranch, Mohave River Canyon, *Parish 4858*; Tejon Pass, *Hall 6264*.

4. AMORPHA. FALSE INDIGO.

Twigs and leaf-rachis with prickle-like glands; calyx-teeth triangular-lanceolate, over half the length of the tube. 1. *A. californica*.

Twigs and leaf-rachis without prickle-like glands; calyx-teeth short-triangular. 2. *A. occidentalis*.

1. *AMORPHA CALIFORNICA* Nutt. in Torr. & Gray, Fl. N. Am. 1: 306. 1838.

Type locality: "Santa Barbara; near the coast."

Distribution: In the chaparral of the coast slope of the southern California mountains, from the vicinity of Santa Barbara southward to San Pedro Martir Mountain. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall*; Mount Pinos, *Elmer 3950*; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor 130*; Mount Wilson, *Grant 39*; Little Santa Anita Canyon, San Gabriel Mountains, *Abrams 2622*; San Bernardino

Mountains, *Hall 1288*; Deep Creek, *Abrams & McGregor 731*; Hathaway Flat, San Bernardino Mountains, *Abrams & McGregor 806*; Santa Ana Mountains, *Abrams 1828*.

2. *Amorpha occidentalis* sp. nov.

Shrubby below, 2–3 meters high; flowering branchlets minutely pubescent; leaf-rachis sparsely pubescent, without pickle-like glands, bearing 8–10 pairs of leaflets; leaflets ovate to narrowly oblong, sparsely pubescent with short-appressed hairs, firm in texture, 2–4 cm. long; raceme 10–18 cm. long; pedicels 1.5 mm. long; calyx-tube nearly glabrous, scarcely 2 mm. long; calyx-teeth very short, triangular, densely short-villous; petal about 5 mm. long; mature fruit not seen.

This species has been understood as *A. californica* Nutt., but Nuttall's specimens in the Torrey Herbarium, although too young to determine accurately the character of the calyx-teeth, have prickle-like glands. Plants from Santa Barbara, the type locality, agreeing with Nuttall's as to prickle-like glands, have lanceolate calyx-teeth nearly equaling the tube. I have not seen the type of *A. hispidula* Greene, but the central California plants are less pubescent, and have relatively shorter calyx-teeth.

Type: San Diego River, near the Old San Diego Mission, *Abrams 3425*, May 6, 1903. Type specimen deposited in the Stanford University Herbarium.

Distribution: Foothills of the San Bernardino Mountains southward to San Diego, and probably adjacent Lower California. Upper and Lower Sonoran.

Specimens examined: Foothills, San Bernardino Mountains, *Parish*, June, 1900; Reche Canyon, San Jacinto Mountains, *Hall*, May 15, 1900; eastern base of the San Jacinto Mountains, *Hall 2121*; Janal, altitude 300 meters, *Susan G. Stokes*, June 19, 1895; San Diego, *Palmer 65*; Jacumba Hot Spring, *Cleveland*, July 3, 1884; Julian, *Dunn*, Aug. 1892.

5. PAROSELA. DALEA.

Leaves pinnate.

Calyx hoary-tomentose, its lobes slender, equaling or exceeding the tube.

Calyx 4–5 mm. long; spikes short, head-like. 1. *P. Emoryi*.

Calyx 8–10 mm. long; spikes loose, 3–4 cm. long. 2. *P. arborescens*.

Calyx appressed silky-pubescent to nearly glabrous, its lobes broad, usually shorter than the tube.

Glands not prickle-like; branchlets appressed-pubescent.

Calyx densely appressed silky-pubescent.

3. *P. californica*.

Calyx sparsely appressed-pubescent.

4. *P. Fremontii*.

Glands prickly-like; branches hirsute.

5. *P. Saundersii*.

Leaves simple.

Herbage green and nearly glabrous; leaves narrowly linear.

6. *P. Schottii*.

Herbage hoary with a minute appressed pubescence.

7. *P. spinosa*.

1. *PAROSELA EMORYI* (A. Gray) Heller, Cat. N. Am. Pl. ed. 2, 6.
1900.

Dalea Emoryi A. Gray, Mem. Am. Acad. II. 5: 315. 1855.

Type locality: "On the desert table-lands of the Gila."

Distribution: Western borders of the Colorado Desert, eastward to southern Arizona, and southward into Lower California and Sonora. Lower Sonoran.

Specimens examined: Palm Springs, *Parish 4112*; Carriso Creek, *Abrams 3987*; Signal Mountain, *Abrams 3180*, and Dec. 29, 1907.

2. *PAROSELA ARBORESCENS* (Torr.) Heller, Cat. N. Am. Pl. ed. 2, 5.
1900.

Dalea arborescens Torr.; A. Gray, Mem. Am. Acad. II. 5: 316.
1855.

Type locality: "Mountains of San Fernando, a southern branch of the Sierra Nevada, California."

Distribution: Apparently confined to the arid mountains and hills of the Mohave Desert. Lower Sonoran.

Specimens examined: Barstow Hills, Mohave Desert, *Hall 6160*; Black's ranch, 32 kilometers northwest of Barstow, *Hall* & *Chandler 6851*.

3. *PAROSELA CALIFORNICA* (S. Wats.) Vail, Bull. Torrey
Club 24: 17. 1897.

Dalea californica S. Wats. Proc. Am. Acad. 11: 132. 1876.

Type locality: "Collected by Dr. Parry in the San Bernardino Mountains, California." According to the "Botany of California" Parry's specimens were collected "in dry washes in the San Bernardino Mountains, near Cajon Pass."

Distribution: Desert slopes of the San Bernardino and San Jacinto Mountains, eastward to southern Utah. Lower Sonoran.

Specimens examined: Canyon of the San Jacinto River, altitude 660 meters, *Hall* 2008; Banning, *Davidson*, June, 1892; Warren's Well, altitude 1160 meters, *Parish* 2992; Pipe Canyon, *Parish* 2991; no locality, *Parry & Lemmon* 86; Banning, *Davidson*, June, 1892.

4. *PAROSELA FREMONTII* (Torr.) Vail, Bull. Torrey Club 24: 16. 1897.

Dalea Fremontii Torr.; A. Gray, Mem. Am. Acad. II. 5: 316. 1855.

Type locality: "Mountains of the Pah-Utah country, S. W. California." This was collected by Fremont May 5, 1844, and according to Fremont's itinerary he was on what is now known as Muddy River a few miles above its junction with Virgin River, southern Nevada.

Distribution: Southern Utah and Nevada westward to the Providence Mountains. Lower Sonoran.

Specimens examined: Providence Mountains, *Brandege*, May 24, 1902.

5. *Parosela Saundersii* (Parish).

Dalea Saundersii Parish, Bull. S. Calif. Acad. 2: 83. 1903.

Type locality: "In desert sands, near Victorville, cir. 3000 ft. alt., in the Mohave Desert."

Distribution: Mohave Desert, southern California. Lower Sonoran.

Specimens examined: Near Victorville, *Hall* 6197; near Kane Springs, Ord Mountains, *Hall & Chandler* 6826 (?).

6. *PAROSELA SCHOTTII* (Torr.) Heller, Cat. N. Am. Pl. ed. 2, 6. 1900.

Dalea Schottii Torr. Bot. Mex. Bound. 53. 1859.

Type locality: "Diluvial banks of the Colorado."

Distribution: Western borders of the Colorado Desert, eastward to southwestern Arizona. Lower Sonoran.

Specimens examined: Palm Springs, *Parish* 4113; *Hall* 5758; diluvial banks of the Colorado, *Schott*, Feb. 1855; Chuckawalla Mountains, *Hall* 5973; Borregos Springs, *Brandege*, April 29, 1894.

7. *PAROSELA SPINOSA* (A. Gray) Heller, Cat. N. Am.

Pl. ed. 2, 7. 1900.

Dalea spinosa A. Gray, Mem. Am. Acad. II. 5: 315. 1855.

Asagraea spinosa Baillon, Adansonia 9: 233. 1870.

Type locality: "Arroyos on the Gila; and on the California desert west of the Colorado."

Distribution: Western borders of the Colorado Desert, and extending eastward to southern Arizona, and southward into Lower California. Lower Sonoran.

Specimens examined: Palm Springs, *Hall* 5758; Carriso Creek, *Abrams* 3980.

6. *OLNEYA*. IRONWOOD.

1. *OLNEYA TESOTA* A. Gray, Mem. Am. Acad. II. 5: 328. 1855.

Type locality: "On the table-lands of the Gila," and "near Bill Williams' Fork," Arizona.

Distribution: The Colorado Desert of southern California, eastward into Arizona, and southward into Lower California and Sonora. Lower Sonoran.

Specimens examined: Signal Mountain, *Abrams*, Dec. 29, 1907.

ZYGOPHYLLACEAE. CALTROP FAMILY.

1. *COVILLEA*. CREOSOTE-BUSH.

1. *COVILLEA TRIDENTATA* (Moc. & Sesse) Vail, Bull. Torr.

Bot. Club 26: 302. 1899.

Zygophyllum tridentatum Moc. & Sesse; DC. Prod. 1: 706. 1824.

Zygophyllum californicum Torr. & Frem. in Frem. Second Rep. 257. 1845.

Type locality: "In regno Mexicano."

Distribution: The most common and widely distributed shrub of the desert districts of southern California, extending eastward to western Texas, and southward through the arid regions of Mexico and Lower California. Lower Sonoran.

Specimens examined: Willow Springs, *Abrams* & *McGregor* 424; Lancaster, *Elmer* 3664; Cushenberry Springs, *Abrams* 2147; Imperial Junction (Old Beach), *Abrams* 3202; Jacumba Hot Spring, *Abrams* 3675.

RUTACEAE. RUE FAMILY.

Leaves alternate; fruit a 2-lobed coriaceous capsule.
Leaves opposite; fruit a drupe.

1. *Thamnosma*.
2. *Cneoridium*.

I. THAMNOSMA.

- I. *THAMNOSMA MONTANUM* Torr. & Frem. in Frem. Second Rep. 313. 1845.

Type locality: "Passes of the mountains, and on the Virgin river in Northern California."

Distribution: Western borders of the Colorado Desert, extending southward into northern Lower California, and eastward to Arizona and southern Utah.

Specimens examined: Mission Creek bench, eastern base of the San Bernardino Mountains, *Parish 2987*; Jacumba Hot Spring, *Abrams 3651*.

2. CNEORIDIUM.

- I. *CNEORIDIUM DUMOSUM* (Nutt.) Hook. f.; Brew. & Wats. Bot. Calif. 1: 97. 1876.

Pitavia dumosa Nutt.; Torr. & Gray, Fl. N. Am. 1: 215. 1838.

Type locality: "St. Diego, California."

Distribution: One of the principal components of the chaparral in the vicinity of San Diego, extending south into northern Lower California, and eastward on the desert slopes of the Cuernavaca and the San Jacinto Mountains; also in Arizona. Lower Sonoran.

Specimens examined: Near San Dieguito (Bernardo), *Abrams 3378*; Valley Center, *McClatchie*, March, 1893.

POLYGALACEAE.

I. POLYGALA.

- I. *POLYGALA CORNUTA* Kell. Proc. Calif. Acad. 1: 62. 1855.

Polygala californica Nutt. Torr. & Gray, Fl. N. Am. 1: 671. 1840, as a synonym.

Polygala Fishiae Parry, Proc. Davenp. Acad. 4: 39. 1884.

Type locality: Placerville.

Distribution: Sierra Nevada and the mountains of Santa Barbara County, southward to Lower California. A slender, sparsely branched, shrubby plant often growing a meter or more high. Upper Sonoran.

Specimens examined: Near Santa Barbara, *Torrey* 74; San Gabriel Mountains near Pasadena, altitude 1200 meters, *McClatchie*, July, 1893; Sierra Madre and Mount Wilson trail, altitude 1200 meters, *Abrams*, July, 1906; Canyon back of Monrovia, *Dudley*, Dec. 1907.

EUPHORBIACEAE. SPURGE FAMILY.

Flowers not in involucre; perianth evident, of several segments.

Flowers dioecious; herbage densely stellate-pubescent. 1. *Bernardia*.

Flowers monoecious; herbage not stellate-pubescent.

Staminate flowers uppermost; herbage pubescent with simple hairs;
leaves ovate, crenate-serrate. 2. *Acalypha*.

Pistillate flowers uppermost; leaves large, palmately lobed; glabrous.
3. *Ricinus*.

Flowers in involucre; perianth represented by a minute scale at the base of
a filament-like pedicel. 4. *Trichostigma*.

1. BERNARDIA.

1. *BERNARDIA MYRICAEFOLIA*. (Scheele) S. Wats. Bot. Calif. 2:
70. 1880.

Tyria myricaefolia Scheele, Linnaea 25: 581. 1852.

Ricinella myricaefolia Muell. Arg. Linnaea 34: 153. 1865.

Type locality: "An Waldrändern auf felsigem Boden, nördlich von Neubraunfels, am Rande der Hochebene."

Distribution: Mohave and Colorado Deserts, eastward to western Texas and northern Mexico. Lower Sonoran.

Specimens examined: San Felipe, *Parry*, 1850.

2. ACALYPHA.

1. *ACALYPHA CALIFORNICA* Benth. Bot. Sulph. 51. 1844.

Type locality: "Bay of Magdalena," Lower California.

Distribution: Southwestern San Diego County southward at least to Magdalena Bay. Lower Sonoran.

Specimens examined: Poway, *Parish* 4430; near San Dieguito, *Abrams* 3388; between Jamul and Jamacha, *Abrams* 3744.

3. RICINUS. CASTOR BEAN.

1. *RICINUS COMMUNIS* L. Sp. Pl. 1007. 1753.

Type locality: "Habitat in India utraque, Africa, Europa australi."

Distribution: The castor bean has become fairly well naturalized in many parts of southern California, and often develops into small trees, 4-5 meters high.

4. TRICHEROSTIGMA.

I. TRICHEROSTIGMA MISERUM (Benth.) Kl. & Garcke, Monatsb. Akad. Berl. 248. 1859.

Euphorbia misera Benth. Bot. Sulph. 51. 1844.

Type locality: "San Diego," California, and "San Quentin," Lower California.

Distribution: On bluffs near the sea at San Diego, southward through western Lower California, and also on the islands off the coast of southern California. Lower Sonoran.

Specimens examined: Santa Catalina Island, *Blanche Trask*, Dec. 1900; San Diego, *Parry*, 1850; *Palmer* 452; *Pringle*, May, 1882; *Jones*, 1882; Point Loma, *Abrams* 3458.

BUXACEAE. BOX FAMILY.

I. SIMMONDSIA.

I. SIMMONDSIA CALIFORNICA Nutt. Lond. Journ. Bot. 3: 401, pl. 16. 1844.

Type locality: "Covering the sides of barren hills, in argillaceous soils, near the sea, in the vicinity of St. Diego in Upper California."

Distribution: Vicinity of San Diego, southward through northern Lower California, and eastward to Arizona. Lower Sonoran.

Specimens examined: Oneonta, *Herre*, Aug., 1902; Mission Hills, San Diego, *Abrams* 3424; San Diego, *Palmer* 356; *Parry*, 1850.

ANACARDIACEAE. SUMAC FAMILY.

Leaves compound, deciduous.

Fruit glabrous; nut globose, striate.

1. *Toxicodendron*.

Fruit viscid-pubescent and often villous; nut flattened, smooth.

2. *Schmalzia*.

Leaves simple, evergreen; nut smooth.

Flowers in dense racemes; fruit pubescent; pericarp viscid, acid.

3. *Neostyphonia*.

Flowers in compound panicles; fruit small, glabrous; pericarp mealy.

4. *Lithraea*.

1. TOXICODENDRON. POISON OAK.

1. TOXICODENDRON DIVERSIFOLIUM (Torr. & Gray) Greene, Leaflets 1: 119. 1905.

Rhus diversiloba Torr. & Gray, Fl. N. Am. 1: 218. 1838.

Type locality: "Borders of woods, etc. Oregon," and "California."

Distribution: Western Washington, southward to northern Lower California. Several species have been segregated from this by Greene but I can detect no specific differences between the specimens which I have cited and those from farther north. In any section there is marked variation in the foliage and pubescence, so that these characters cannot be relied upon, within certain limits, in making specific distinctions. Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer* 3940; Fort Tejon, *Abrams & McGregor* 298; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 144; Sulphur Mountain, *Abrams & McGregor* 46; San Gabriel, *Bigelow*, 1854; Pasadena, *Jones* 3206.

Rhus glabra L. has been reported by Parish (Bot. Gaz. 38: 461) from "Chino Cañon, near Palm Springs, at the desert base of San Jacinto Mt.," where it was collected by *Hasse*.

2. SCHMALTZIA. SQUAW BERRY.

Fruit not villous.

1. *S. cruciata*.

Fruit villous.

Herbage minutely puberulent.

2. *S. straminea*.

Herbage densely soft-pubescent.

3. *S. malacophylla*.

1. SCHMALTZIA CRUCIATA Greene, Leaflets 1: 139. 1905.

Type locality: "Hot Springs in the northern part of San Diego Co., Calif."

Distribution: I have not been able to examine the original specimens upon which this species was based, nor have I seen any plants that answer the description. The validity of the numerous species proposed by Greene, for what has passed as *S. trilobata* (*Rhus trilobata*) can only be judged by thorough field work and the critical examinations of a large series of specimens. Upper Sonoran.

2. *SCHMALTZIA STRAMINEA* Greene, Leaflets 1: 139. 1905.

Type locality: "Along Lytle Creek, San Gabriel Reserve, Calif."

Distribution: The puberulent form is apparently confined to the foothills and chaparral of the interior part of southern California. Upper Sonoran.

Specimens examined: Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor 149*; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor 320*.

3. *SCHMALTZIA MALACOPHYLLA* Greene, Leaflets 1: 138. 1905.

Type locality: "Griffith Park, Los Angeles Co., Calif."

Distribution: Apparently restricted to the coastal foothills. The lobation of the leaves is variable, and there seems to be no distinguishing characters between this and the preceding species except pubescence, the stability of which is doubtful. Upper Sonoran.

Specimens examined: North slope of the Santa Monica Mountains, between Encino and Cahuenga Pass, *Abrams 1310*; Sepulveda Canyon, Santa Monica Mountains, *Abrams 3113*; Playa del Rey (Ballona Harbor), *Abrams 286*; Arroyo Seco, near Pasadena, *Grinnell*, July 30, 1903.

3. *NEOSTYPHONIA*. LEMONADE BERRY.

Leaves oval, very obtuse at both ends.

1. *N. integrifolia*.

Leaves ovate, acute at apex.

2. *N. ovata*.

1. *NEOSTYPHONIA INTEGRIFOLIA* (Nutt.) Shafer, in Britton, N. Am. Trees 612. 1908.

Styphonia integrifolia Nutt. Torr. & Gray, Fl. N. Am. 1: 220. 1838.

Rhus integrifolia Benth. & Hook.; S. Wats. U. S. Geograph. Surv. 6: 84. 1878.

Styphonia serrata Nutt. in Torr. & Gray, Fl. N. Am. 1: 220. 1838.

Type locality: "On the margins of cliffs near the sea around San Diego and Santa Barbara."

Distribution: Santa Barbara, southward through northern Lower California. In the northern part of its range it is confined to the sea-coast, but southward especially in San Diego County it

extends inland even to the desert slopes of the Cuimaca Mountains. Upper and Lower Sonoran.

Specimens examined: Santa Barbara, *Nuttall*; *Parry*, 1850; *Elmer* 3898; Los Angeles, *Franceschi*, 1893; Playa del Rey, *Abrams* 287; Big Tejunga Wash, San Fernando Valley, *Abrams* 1385; Claremont, *Baker* 4156; Ysidora, *Abrams* 3307; San Diego, *Brandegge* (distributed by *C. F. Baker* 818); *Herre*, July 23, 1902.

2. *Neostyphonia ovata* (S. Wats.).

Rhus ovata S. Wats. Proc. Am. Acad. 20: 358. 1885.

Type locality: "On hills and mountains, away from the coast, from San Diego to Los Angeles County, the Cantillas Mountains in Lower California, and in Southern Arizona; also on Santa Catalina Island."

Distribution: Santa Ynez Mountains, southward through the chaparral belt of the coastal slope to northern Lower California; also on the islands of the coast of southern California, and in Arizona. Upper Sonoran.

Specimens examined: Santa Ynez Mountains, *Brandegge*; *Dunn*, 1891; *Elmer* 3904; San Fernando Mountains, near Chatsworth, *Abrams* 1369; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2559; Sawpit Canyon, San Gabriel Mountains, *Dudley*, Dec. 1907; hills near Monrovia, *Baker* 4147; Lone Pine Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 677; Redlands, *Parish*, April 21, 1891; Fallbrook, *Jones* 3318; between Campo and Potrero, *Abrams* 3719.

4. LITHRAEA. CALIFORNIA SUMAC.

1. LITHRAEA LAURINA (Nutt.) Walp. Rep. 1: 551. 1842.

Rhus laurina Nutt.; Torr. & Gray, Fl. N. Am. 1: 219. 1838.

Type locality: "On bushy plains, near St. Barbara, California."

Distribution: Southern slopes of the Santa Ynez Mountains southward to northwestern Lower California, and on the islands as far south as Cedros Island. In southern California this species is confined chiefly to the lower portions of the chaparral belt. Upper and Lower Sonoran.

Specimens examined: Santa Barbara, *Elmer* 4015; Mountain Drive, Santa Barbara, *Abrams* 4154; Santa Monica Canyon, *Abrams* 2192; Scoville's Hill, Pasadena, *Grinnell*, July 3, 1903;

near San Gabriel, *Bigelow*, March 23, 1854; Little Santa Anita Canyon, San Gabriel Mountains, *Abrams* 2639; near Monrovia, *Dudley*, Dec. 8, 1907; hills near Elsinore Lake, *Dutton*, June 2, 1898; Jamul, *Susan G. Stokes*, June 19, 1895; San Diego, *Herre*, July 23, 1902; *Chandler* 4122.

RHAMNACEAE. BUCKTHORN FAMILY.

Fruit drupaceous, free from the calyx.

Drupe enclosing a single stone.

1. *Condalia*.

Drupe enclosing 2-4 nutlets.

2. *Rhamnus*.

Fruit becoming nearly or quite dry, partly inferior.

Calyx-lobes deciduous; style elongated, 3-lobed.

3. *Ceanothus*.

Calyx-lobes persistent; style short, notched.

4. *Adolphia*.

I. CONDALIA.

Petals none; sepals persistent; drupe 5 mm. long.

1. *C. spathulata*.

Petals present; sepals deciduous.

Drupe 5 mm. long, beakless; herbage canescent.

2. *C. divaricata*.

Drupe 15 mm. long, beaked; herbage glabrous.

3. *C. Parryi*.

1. CONDALIA SPATHULATA A. Gray, Pl. Wright. 1: 32. 1852.

Type locality: "On the Rio Grande, Texas; and prairies on the San Felipe."

Distribution: Southwestern Texas to the Colorado Desert of southern California. I have not seen any specimens of this from southern California, but according to Trelease (A. Gray, Syn. Fl. 1, pt. 1: 403) it has been collected at Mesquite, *Parish* 793. Lower Sonoran.

2. CONDALIA DIVARICATA A. Nelson, Bot. Gaz. 47: 427. 1909.

Zizyphus lycoides canescens A. Gray, U. S. Geog. Sur. 6: 82. 1878.

Condalia lycoides canescens Trelease, A. Gray, Syn. Fl. 1, pt. 1: 403. 1897.

Type locality: "Las Vegas, Nevada."

Distribution: Southern Nevada southward through western Arizona and the deserts of southern California to northern Lower California. Lower Sonoran.

Specimens examined: I have not seen any specimens from southern California, but according to Trelease (l. c.) it has been collected by *Parish* at Mammoth Tank in the Colorado Desert.

3. *CONDALIA PARRYI* (Torr.) Weberbauer, in Engler & Prantl, Nat. Pflanzenf. 3, ab. 5: 404. 1895.

Zizyphus Parryi Torr. Bot. Mex. Bound. 46. 1859.

Type locality: "Gravelly ravines near San Felipe, California."

Distribution: Western borders of the Colorado Desert southward to Lower California. Lower Sonoran.

Specimens examined: Morongo Canyon, altitude 1000 meters, *Parish* 2969; Whitewater Canyon, *Pringle*, March 25, 1882; San Felipe, *Parry*, 1850; Jacumba Hot Spring, *Abrams* 3659.

2. RHAMNUS. BUCKTHORN OR COFFEE BERRY.

Flowers polygamo-dioecious; petals none; leaves pungently toothed.

Branches spinescent; leaves obovate, 6-12 mm. long; calyx-lobes triangular.

1. *R. crocea*.

Branches not spinescent; leaves 12-40 mm. long; calyx-lobes lanceolate.

Leaves becoming glabrous and shiny; anthers 1 mm. long.

2. *R. ilicifolia*.

Leaves more or less pilose; anthers 0.5 mm. long.

3. *R. pilosa*.

Flowers perfect; petals minute, emarginate; leaves not pungently toothed.

Leaves green and glabrous beneath.

4. *R. californica*.

Leaves canescent beneath.

Leaves entire, tomentulose beneath.

5. *R. tomentella*.

Leaves serrulate, hirsutulose beneath.

6. *R. cuspidata*.

1. *RHAMNUS CROCEA* Nutt. in Torr. & Gray, Fl. N. Am.

1: 261. 1838.

Type locality: "Around Monterey, California."

Distribution: Coast Ranges of central California, southward to northern Lower California. In southern California it occurs on dry exposed ridges in the lower part of the chaparral belt, especially on the footslopes of the mountains. Upper and Lower Sonoran.

Specimens examined: Montecito, *Franceschi*, 1894; Big Tejuanga Wash, *Abrams* 1370; Arroyo Seco, near Pasadena, *Grinnell*, July 30, 1903; mesas near San Bernardino, *Parish*, May 26, 1898; San Diego, *Jones* 3087; *Brandege*, 1889; Coronado, *Dunn*, April 7, 1891; Tia Juana, *Abrams* 3499.

2. *RHAMNUS ILICIFOLIA* Kell. Proc. Calif. Acad. 2: 37. 1863.

Rhamnus crocea ilicifolia Greene, Fl. Fran. 79. 1891.

Type locality: "Vicinity of Clear Lake."

Distribution: Coast Ranges from Lake County southward to the southern boundary of the State. In southern California this is a larger, less rigid bush than *R. crocea*, with leaves that very closely resemble those of *Laurocerasus ilicifolia*. It is a common shrub in the chaparral belt of the coastal slope. Upper Sonoran.

Specimens examined: Santa Barbara, *Parry*; Santa Ynez Mountains, *Brandege*, May, 1888; Sulphur Mountain Spring, *Abrams & McGregor* 39; Saugus, *Elmer* 3649; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 3114; Pasadena, *Brandege*, May, 1888; San Gabriel Canyon, *Abrams* 1020; Claremont, *Baker* 3653; Pasadena, *Grinnell*, Aug. 1, 1903; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor* 333; Cleghorn Canyon, San Bernardino Mountains, *Abrams & McGregor* 710; Temecula Canyon, *Greene*, June, 1889; Campo, *Abrams* 3587.

3. RHAMNUS PILOSA (Trelease) Abrams, Bull. Torr. Bot. Club 37: 153. 1910.

Rhamnus crocea pilosa Trellease; Curran, Proc. Calif. Acad. II. 1: 251. 1888.

Type locality: "Santa Maria Valley, in the mountains back of San Diego."

Distribution: Mountains and foothills of San Diego County. Upper Sonoran.

Specimens examined: Mountains east of San Diego, *Parry*, 1859; San Diego, *Parry*; 1850; vicinity of San Ysabel, *Henshaw* 235; San Felipe, *Susan G. Stokes*, July 26, 1895.

4. RHAMNUS CALIFORNICA Esch. Mem. Acad. Petersb. 10: 285. 1823.

Rhamnus oleifolia Hook. Fl. Bor. Am. 1: 123, pl. 44. 1833.

Endotropis oleifera Raf. Sylva Tellur. 31. 1838.

Rhamnus laurifolius Nutt. in Torr. & Gray, Fl. N. Am. 1: 260. 1848.

Perfonon laurifolium Raf. Sylva Tellur. 29. 1838.

Frangula californica A. Gray, Gen. III. 2: 178. 1849.

Rhamnus Purshiana californica Rehder, in Bailey, Cyclop. Am. Hort. 1510. 1902.

Type locality: "In Novae Californae fruticetis."

Distribution: In the Coast Ranges, from Mendocino County

southward to San Bernardino County. In southern California this is a common shrub in the chaparral on the mountains and foothills, especially toward the coast. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall*; *Torrey*, 1850; Pasadena, *Jones*, May 8, 1882; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2541; Claremont, *Baker* 3443; San Gabriel Canyon, *Leiberg* 3404; Arroyo Seco, above Devil's Gate, *Abrams* 1427; Mill Creek, San Bernardino Mountains, *Abrams* & *McGregor* 822; Cleghorn Canyon, San Bernardino Mountains, *Abrams* & *McGregor* 709.

5. *RHAMNUS TOMENTELLA* Benth. Pl. Hartw. 303. 1848.

Rhamnus californica tomentella Brew. & Wats. Bot. Calif. 1: 101. 1876.

Rhamnus Purshiana tomentella K. Brand. Zoe 1: 244. 1890.

Type locality: "In montibus Sacramento."

Distribution: In the chaparral belt of the Sierra Nevada, extending southward to northern Lower California, and eastward to Arizona. In southern California this species replaces *R. californica* on the more interior mountains away from the influence of the coast fogs. Upper Sonoran.

Specimens examined: Mount Pinos, *Elmer* 3817; Sespe Creek, near Ten Sycamore Flat, *Abrams* & *McGregor* 166; Sisar Canyon, Topatopa Mountains, *Abrams* & *McGregor* 66; foothills of the San Bernardino Mountains, *Parish*, June 26, 1898; San Diego, *Parry*, 1850; Palomar Mountain, *McClatchie*, July, 1896; near Foster's, *Abrams* 7371; Cuiamaca Mountains, between Julian and Cuiamaca, *Abrams* 3962; Buckman's Springs, *Susan G. Stokes*, July 18, 1895; hills near Campo, *Abrams* 3695.

6. *RHAMNUS CUSPIDATA* Greene, Leaflets 1: 64. 1904.

Type locality: "Near Tehachapi."

Distribution: Tehachapi Mountains, southward along the desert slopes of the San Gabriel and the San Bernardino Mountains. Upper Sonoran.

Specimens examined: Rock Creek, *Abrams* & *McGregor* 532, 621; Oakgrove Canyon, Liebre Mountains, *Abrams* & *McGregor* 327; Lone Pine Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 664; Hathaway Flat, San Bernardino Mountains, *Abrams* & *McGregor* 809.

3. CEANOTHUS. WILD LILAC.

**Stipules thin and mostly fugacious; leaves alternate; capsules without dorsal or apical horns; flowers racemose or paniculate.*

Leaves deciduous, entire, pinnately veined, or somewhat 3-nerved in the first species; twigs not at all spinescent; flowers white, paniculate.

Leaves ovate, pubescent above; capsule smooth, slightly crested, 4-5 mm. broad.

1. *C. integerrimus puberulus.*

Leaves elliptic, glabrous above; capsules roughened, rather prominently crested, 7 mm. broad.

2. *C. Palmeri.*

Leaves evergreen; flowers blue or rarely white.

Leaves pinnately veined, elliptic, entire; twigs slender, spinescent; arborescent shrub.

3. *C. spinosus.*

Leaves 3-nerved, ovate-lanceolate to ovate.

Twigs stiff and spinescent; leaves entire and glabrous (except in no. 5).

Erect branching shrubs, racemes elongated.

Leaves often sparsely glandular-toothed, pubescent above.

4. *C. divaricatus.*

Leaves entire, glabrous above.

4a. *C. divaricatus eglandulosus.*

Spreading, flat-topped shrub; twigs pale or olive color; raceme short, spreading.

5. *C. cordulatus.*

Twigs not at all spinescent; leaves glandular-toothed, pubescent.

Large arborescent shrubs or small trees.

Capsules glabrous.

Leaves glabrous above. 6. *C. sorediatus.*

Leaves pubescent above.

Leaves minutely velvety-pubescent above, densely white-tomentose beneath.

7. *C. tomentosus.*

Leaves somewhat hirsute above, not velvety, hirsute beneath; twigs hirsute or villous.

8. *C. oliganthus.*

Capsules glandular-villous; leaves and twigs pubescent.

9. *C. Orcuttii.*

Low shrubs, 3-10 dm. high.

Leaves elliptic or narrowly ovate, 2 cm. long or less.

10. *C. austro-montanus.*

Leaves round-ovate, their veins deeply impressed on the back, 1 cm. long or less, villous.

11. *C. impressus.*

***Stipule-bases persistent, thick and corky or spongy; capsule usually with dorsal or apical horns as well as crests; flowers umbellate, white or rarely blue (no. 15).*

Leaves alternate.

Leaves narrowly obovate, cuneate, entire; capsule 7-10 mm. broad, horns dorsal, stout.

12. *C. megacarpus.*

Leaves broadly obovate, usually denticulate; capsule 6 mm. broad, neither crested nor horned.

13. *C. verrucosus*.

Leaves opposite.

Horns of capsules dorsal, spreading, slender; leaves usually toothed, often concave, tomentose to nearly glabrous above.

14. *C. vestitus*.

Horns near the summit, erect.

Leaves pungently toothed; horns stout.

Twigs and leaves glabrous or sparsely pubescent, the latter prominently toothed and holly-like; flowers blue.

15. *C. Jepsoni*.

Twigs and under surface of leaves tomentose, the latter with shallow teeth; flowers white.

Venation on under surface of leaves hidden by the dense tomentum; leaves strongly revolute.

16. *C. crassifolius*.

Venation distinct through the fine tomentum; leaves not revolute.

16a. *C. crassifolius planus*.

Leaves entire; canescent below, with short, incurved hairs; horns rather slender.

17. *C. cuneatus*.

1. *Ceanothus integerrimus puberulus* (Greene).

Ceanothus puberulus Greene, Leaflets 1: 66. 1904.

Type locality: "Altitude of 4000 and 5000 feet in the San Bernardino Mountains."

Distribution: Frazier Mountain southward to the San Jacinto Mountains. Transition.

This southern plant differs from the typical form in being pubescent on the upper surface of the leaves, since this character is not constant its true relation seems best expressed in the varietal rank.

Specimens examined: Goodnough Meadow, *Dudley* 4755; canyon near Elizabeth Lake, *Dudley* 4419; Liebre Mountain, *Abrams* & *McGregor* 369; Mount Gleason, *Elmer* 3595; Mount Wilson, *Grant* 149; North Baldy, altitude 1800 meters, *Abrams* & *McGregor* 585; Lytle Creek Canyon, 1740 meters, *Hall*, May, 1899; Cañon Diablo, *Parish* 4693; Huston's Flat, *Shaw* & *Illingsworth* 157; Cleghorn Canyon, *Abrams* & *McGregor* 712; Hathaway Flat, *Abrams* & *McGregor* 810; summit of Mount Santiago, *Abrams* 1843.

2. *CEANOTHUS PALMERI* Trelease, Proc. Calif. Acad.

II. 1: 109. 1888.

Ceanothus spinosus Palmeri K. Brand. Proc. Calif. Acad. II. 4: 185. 1894.

Type locality: "Mountains of Southern California (Palmer, 1875, 42)."

Distribution: Mountains of Ventura County and the Cuiamaca Mountains. Transition.

Specimens examined: Topatopa Mountains, *Abrams & McGregor* 123; Cuiamaca Mountains, *Palmer* 23; Cuiamaca, *Brandegee*, June 15, 1894, and June 3, 1896; Middle Peak, Cuiamaca Mountains, *Abrams* 3853.

3. *CEANOETHUS SPINOSUS* Nutt. in Torr. & Gray, Fl. N. Am.
1: 1838. 267.

Type locality: "Mountains of St. Barbara."

Distribution: Mountains of southern California, toward the coast, from Santa Barbara County south to Orange County. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall; Parry*, 1850; *Elmer* 3917; *Franceschi*, April 4, 1894; Lockwood Creek, *Dudley*, June, 1896; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 291, 3115; near Los Angeles, *Davidson*, 1891; Trabuco Canyon, Santa Ana Mountains, *Abrams* 1854.

4. *CEANOETHUS DIVARICATUS* Nutt. in Torr. & Gray, Fl. N. Am.
1: 266. 1838.

Type locality: "Mountains of St. Barbara, California, and also near the town."

Distribution: Mountains of Monterey County, southward to the San Bernardino Mountains. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall; Douglas; Brewer* 286; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 157; Sisar Canyon, altitude 1050 meters, *Abrams & McGregor* 63; Hines Peak, Topatopa Mountains, *Abrams & McGregor* 83; Cold Creek, San Bernardino Mountains, altitude 1500 meters, *Abrams & McGregor* 828.

4a. *CEANOETHUS DIVARICATUS EGLANDULOSUS* Torr. Pacif.
R. Rep. 4: 75. 1857.

Ceanothus eglandulosus Trelease, Proc. Calif. Acad. II. 1: 10. 1888.

Ceanothus leucodermis Greene, Kew Bull. 1895: 15. 1895.

Type locality: "On mountains near San Gabriel" and "Cohon Pass."

Distribution: Liebre Mountains, southward to northern Lower California. This is one of the characteristic shrubs of the chaparral on the interior mountains in southern California. Upper Sonoran.

Specimens examined: Near San Gabriel, *Bigelow*, March 22, 1853 (type); Sawpit Canyon, San Gabriel Mountains, *Dudley*, Dec. 1907; Mount Wilson trail, *Abrams*, July 19, 1906; near the summit of Mount Wilson, *Abrams* 2609; Mount Gleason, *Elmer* 3610; Big Tejunga Wash, *Abrams* 1371; Oakgrove Canyon, Liebre Mountains, *Abrams* & *McGregor* 328; Cajon Pass, *Bigelow*, 1853; Cañon Diablo, *Parish* 4694; Cleghorn Canyon, San Bernardino Mountains, *Abrams* & *McGregor* 711; Santa Ana Mountains near Elsinore, *Baker* 4144; *Abrams*, July 21, 1908; Nuevo, *Brandegee* 10; Cottonwood grade, near Potrero, *Abrams* 3731.

5. *CEANOTHUS CORDULATUS* Kell. Proc. Calif. Acad. 2: 124, pl. 39. 1861.

Type locality: "Brought by Dr. J. A. Veatch from Washoe."

Distribution: Sierra Nevada Mountains, southward through the mountains of southern California, where it is rather common in the higher altitudes of the Transition and Canadian Zones.

Specimens examined: North Baldy, altitude 2250 meters, *Abrams* & *McGregor* 618; Mount San Antonio, altitude 2000 meters, *Hall* 1217; near Bear Valley, *Abrams* 2866; Mount San Antonio, *Abrams* 2706; Mount San Jacinto, *Hasse* 5660.

6. *CEANOTHUS SOREDIATUS* Hook. & Arn. Bot. Beech. 328. 1840.

Type locality: Collected by Douglas in California.

Distribution: Coast Ranges of central California from Solano County southward to northern Santa Barbara County, also in the San Gabriel Mountains. Upper Sonoran.

Specimens examined: Sawpit Canyon, San Gabriel Mountains, *Dudley*, Dec. 1907.

7. *CEANOTHUS TOMENTOSUS* Parry, Proc. Davenp. Acad. 5: 190. 1889.

Ceanothus oliganthus tomentosus K. Brand. Proc. Calif. Acad. II. 4: 198. 1894.

Type locality: "Brown sandstone ledges, Ione, Amador County."

Distribution: Foothills of the Sierra Nevada in Amador County,

in the chaparral of the San Bernardino Mountains, and in the San Diego region. Upper Sonoran.

Specimens examined: Edgar Canyon, *Parish* 4103; Mill Creek Canyon, *Parish* 2023, 2088; Encinitas, *Brandeggee*, March 28, 1894; San Diego, *Brandeggee* 33; Nuevo, *Brandeggee* 36; San Dieguito, *Abrams* 3732; Cottonwood grade, *Abrams* 3379.

8. *CEANOTHUS OLIGANTHUS* Nutt. in Torr. & Gray, Fl. N. Am. 1: 266. 1838.

Ceanothus hirsutus Nutt. in Torr. & Gray, Fl. N. Am. 1: 266. 1838.

Type locality: "Bushy woods on the hills of St. Barbara."

Distribution: In the chaparral of the mountains of Santa Barbara County, southward to the San Gabriel Mountains, where it extends at least as far eastward as Monrovia. This species is therefore confined chiefly to the coastal mountains. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall*; *Brewer* 289; *Franceschi*, April 2, 1894; *Brandeggee* 30; Santa Ynez Mountains, *Elmer* 3776; *Abrams*, March 6, 1909; Pasadena, *Brandeggee* 31; Mount Wilson trail, *Abrams* 1504; Millard's Canyon, *Abrams* 292; Sawpit Canyon, San Gabriel Mountains, *Dudley*, Dec., 1907.

9. *CEANOTHUS ORCUTTII* Parry, Proc. Davenp. Acad. 5: 193. 1889.

Ceanothus hirsutus Orcuttii Trelease, in A. Gray, Syn. Fl. 1, pt. 1: 414. 1897.

Type locality: "High Mountains east of San Diego, C. R. Orcutt."

Distribution: Cuimaca Mountains of San Diego County. Borders of the Transition and Upper Sonoran.

Specimens examined: Nuevo, *Brandeggee* 32; between Julian and Cuimaca, *Abrams* 3965.

10. *Ceanothus austro-montanus* sp. nov.

Low, erect shrub, 3 meters high or less; branchlets reddish or grayish-brown, short-pubescent and glandular; petioles 3 mm. long or less; leaves oblong to narrowly ovate, 8-12 mm. long, 4-6 mm. wide, conspicuously glandular-toothed, minutely appressed-pubescent above, pale beneath and pubescent on the veins; peduncles 3-5 cm. long; racemes a half to a third as long; fruiting

pedicels 5 mm. long; calyx-lobes broadly triangular, nearly 2 mm. high; capsule 3 mm. broad, slightly longer, very shallowly lobed; dorsal crests inconspicuous.

Related to *C. foliosus* Parry of the North Coast Ranges (Marin to Mendocino Counties); but that species has a deeply lobed and relatively broader capsule, and smaller, narrower calyx-lobes.

Type: Coniferous forests, between Julian and Cuimaca, *Abrams* 3966, July 1, 1903. The type specimen is deposited in the Stanford University Herbarium.

Distribution: Cuimaca Mountains, southern California. Transition.

11. *CEANOTHUS IMPRESSUS* Trelease, Proc. Calif. Acad.

II. 1: 112. 1888.

Ceanothus dentatus impressus Trelease, in Gray, Syn. Fl. 1: pt. 1: 415. 1897.

Type locality: "Santa Barbara County."

Distribution: Coastal region of Santa Barbara and San Luis Obispo Counties. Upper Sonoran.

Specimens examined: Surf, *Elmer* 3870.

12. *CEANOTHUS MEGACARPUS* Nutt. N. Am. Sylva, 5: 46. 1846.

Ceanothus macrocarpus Nutt. in Torr. & Gray, Fl. N. Am. 1: 267. 1838. Not Cav. 1794.

Type locality: "Mountains of St. Barbara, California."

Distribution: Mountains and foothills especially toward the coast, from Santa Barbara south to the Santa Monica Mountains. Upper Sonoran.

Specimens examined: Santa Barbara, *Nuttall*; *Brandeggee* 89; *Elmer* 3869; Mountain Drive, *Abrams* 4124; Santa Catalina Island, *Brandeggee* 88; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2560.

13. *CEANOTHUS VERRUCOSUS* Nutt. in Torr. & Gray, Fl. N. Am. 1: 267. 1838.

Type locality: "Low hills near the coast, St. Diego, California."

Distribution: Dry mesas and hills in the vicinity of San Diego, and southward into northern Lower California. Lower Sonoran.

Specimens examined: San Diego, *Nuttall*; *Parry*, 1850; Encinitas, *Brandeggee* 91; hills near San Dieguito, *Abrams* 3739; mesas near San Diego, *Susan G. Stokes*, May 28, 1895.

14. *CEANOTHUS VESTITUS* Greene, *Pittonia* 2: 101. 1890.

Type locality: "Borders of pine forests on the mountains near Tehachapi, Kern Co., Calif."

Distribution: Southern Nevada, southward to the San Bernardino Mountains. In southern California this species is confined chiefly to the desert slopes of the mountains in the piñon belt. Upper Sonoran.

Specimens examined: Mount Pinos, altitude 1800 meters, *Abrams* & *McGregor* 260; Pine Creek near Mutau Flat, *Abrams* & *McGregor* 194; Oakgrove Canyon, Liebre Mountains, *Abrams* & *McGregor* 334; Rock Creek, *Abrams* & *McGregor* 567; eastern slope of Mount San Antonio, altitude 2400 meters *Abrams* 2717; eastern base of the San Jacinto Mountains *Hall* 2156; Cahuilla Valley, *Hall* 1164; San Felipe Canyon, *Brandege* 114; between Campo and Jacumba Hot Spring, *Abrams* 3700.

15. *CEANOTHUS JEPSONI* Greene, *Man. Bay-Region* 78.
1894.

Type locality: "Open hills in Marin Co., near San Geronimo, and northward."

Distribution: This species has only been known from the Coast Ranges north of San Francisco Bay, but the specimens cited below seem identical. The species is closely related to *C. pinetorum* of the southern Sierra Nevada, but that has much more prominent stipules. Upper Sonoran.

Specimens examined: Hills west of Pomona, *Baker* 4001.

16. *CEANOTHUS CRASSIFOLIUS* Torr. *Pacif. R. Rep.* 4: 75.
1857.

Type locality: "Mountains south of Los Angeles."

Distribution: A common shrub in the chaparral from Santa Barbara County, southward to northern Lower California. Upper Sonoran.

Specimens examined: Newhall, *Brandege* 85; Mount Lowe, *Grant* 1147; San Fernando Mountains, near Chatsworth, *Abrams* 1364; Cajon Pass, *Bigelow*, March 16, 1853; Beaumont, *Parish* 4104, Lone Pine Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 672; Santiago Canyon, *Helen D. Geis*, April, 1902; near Foster's, *Abrams* 3767; Nuevo, *Brandege* 84.

16a. *Ceanothus crassifolius planus* var. nov.

Like the type in structural characters but leaves not revolute on the margin, and much less tomentose beneath, the venation being very evident through the sparse tomentum. An apparent geographic variation.

Type: Red Reef Canyon, Topatopa Mountains, Ventura County, *Abrams & McGregor 124*, June 8, 1908. The type specimen is deposited in the Stanford University Herbarium.

Distribution: Mountains of Santa Barbara and Ventura Counties. Upper Sonoran.

Specimens examined: Santa Ynez Mountains, *Elmer 3758*; near Sespe Hot Springs, *Dudley 4777*; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor 124*.

17. *CEANOTHUS CUNEATUS* (Hook.) Nutt. in Torr. & Gray, Fl. N. Am. 1: 267. 1838.

Rhamnus cuneatus Hook. Fl. Bor. Am. 1: 124. 1829.

Type locality: "Near the sources of the Multnomak River, in sandy soils growing under the shade of *Pinus Lambertiana*."

Distribution: Southern Oregon southward throughout California. Upper Sonoran.

Specimens examined: Vicinity of Fort Tejon, *Abrams & McGregor 295*; Cuddy's ranch, *Dudley 4485*; Sisar Canyon, Topatopa Mountains, *Abrams & McGregor 67*; near Azusa, *Abrams 3128*; Elizabeth Lake, *Abrams & McGregor 410*; Colton, *Jones 3176*; San Bernardino, *S. B. & W. F. Parish 1015*; Claremont, *Baker 237*; hills near Campo, *Abrams 3500*; San Clemente Island, *Blanche Trask 198*.

4. ADOLPHIA.

1. *ADOLPHIA CALIFORNICA* S. Wats. Proc. Am. Acad. 11: 126. 1876.

Type locality: "At Solidad and Chollas Valley, near San Diego and near Monterey." The last station is unquestionably an error.

Distribution: From the vicinity of San Diego southward through northern Lower California. Lower Sonoran.

Specimens examined: Near San Diego, *Parry, 1850*; Soledad, *Palmer 44*; *Jones 3132*; Chollas Valley, *Cleveland*; Tia Juana, *Abrams 3481*.

VITACEAE. GRAPE FAMILY.**I. VITIS. GRAPE.****I. VITIS GIRDIANA** Munson, Proc. Soc. Prom. Agr. Sci. 59. 1887.

Type locality: "San Diego Co." and "Los Angeles Co. California."

Distribution: Along streams on the coastal and desert slopes of the southern California mountains, from Santa Barbara southward. Upper Sonoran.

Specimens examined: Sawpit Canyon, San Gabriel Mountains, *Alice Cooper*, Oct. 4, 1908; near Monrovia, *Dudley*, Nov. 1907; Lytle Creek Canyon, *Abrams* 1955; West Fork of Deep Creek, San Bernardino Mountains, *Abrams & McGregor* 723; vicinity of San Bernardino, *Parish* 5013; Jamul Valley, *Susan G. Stokes*, June 19, 1895; between Foster's and Ramona, *Abrams* 3766.

MALVACEAE. MALLOW FAMILY.

Stigmas linear.

1. *Lavatera*.

Stigmas capitate.

Seeds not comose; fruit with a central axis.

2. *Malacothamnus*.

Seeds comose; fruit without a central axis.

3. *Hibiscus*.

I. LAVATERA. TREE MALLOW.**I. LAVATERA ASSURGENTIFLORA** Kell. Proc. Calif. Acad. 1: 14. 1854.

Type locality: "Island of Anacapa, off the coast of Santa Barbara."

Distribution: A native of the islands off the coast of southern California; cultivated on the mainland where it sometimes appears as an escape.

2. MALACOTHAMNUS. BUSH MALLOW.

Calyx and herbage clothed with very short-rayed stellate pubescence.

Leaves green above, sparsely stellate-pubescent.

Inflorescence mostly simple; flower-clusters nearly sessile.

1. *M. fasciculatus*.

Inflorescence branched; flower-clusters lax.

1a. *M. fasciculatus splendidus*.

Leaves hoary on both surfaces, with a dense soft stellate-pubescence.

2. *M. Nuttallii*.

Calyx and herbage clothed with long-rayed hispid-like stellate pubescence.

Leaves 6-8 cm. broad, rugose; calyx-tube not obscured by the pubescence; calyx-lobes triangular.

3. *M. Davidsoni*.

Leaves 2-3 cm. broad; nut rugose; surface of calyx-tube completely hidden by the dense hoary hispid pubescence; calyx-lobes lanceolate-acuminate.

4. *M. orbiculatus*.

I. *MALACOTHAMNUS FASCICULATUS* (Nutt.) Greene,

Leaflets 1: 208. 1906.

Malva fasciculata Nutt. in Torr. & Gray, Fl. N. Am. 1: 226. 1838.

Malvastrum fasciculatum Greene, Fl. Fran. 108. 1891.

Malvastrum Thurberi A. Gray, Mem. Am. Acad. II. 5: 307. 1855.

Type locality: "St. Barbara." Nuttall's specimens are like the form occurring at San Diego, where he probably obtained his specimens, as the species has not since been found at Santa Barbara.

Distribution: The typical form seems to be confined to southwestern San Diego County. Upper and Lower Sonoran.

Specimens examined: "St. Barbara" (?), Nuttall; San Diego, Brandegee (distributed by Baker 1626); Orcutt, 1884; Palmer 25; Abrams 3429; Chollar Valley, Susan G. Stokes, June 15, 1895; Lemon Grove road, Chandler 5298.

1a. *Malacothamnus fasciculatus splendidus*. (Kell.)

Malvastrum splendidum Kell. Proc. Calif. Acad. 1: 67. 1855.

Malvastrum Thurberi laxiflorum A. Gray, Proc. Am. Acad. 22: 291. 1887.

Type locality: Contributed by "Mr. M. A. Wallace of Los Angeles," who probably collected it on the neighboring hills.

Distribution: Santa Monica and San Fernando Mountains, southward to the Santa Ana Mountains and eastward to the San Bernardino Mountains. Upper Sonoran.

Specimens examined: Cahuenga Pass, Davidson, May 1, 1892, and April 10, 1900; Abrams 1246; Verdugo Hills, Abrams 1382; near San Bernardino, Parish, June 15, 1898, Laguna, Orange County, Abrams 1781.

2. *Malacothamnus Nuttallii* sp. nov.

Shrub, 2-3 meters high; branches erect or ascending, canescent with a short-rayed stellate pubescence; petioles 1.5-2.5 cm. long; leaves acutely 5-lobed, crenate-serrate, slightly or not at all cordate, 2.5-4 cm. long, equally hoary on both surfaces with a close,

soft, short-rayed, stellate pubescence; inflorescence loose, compound; bractlets subulate, 2-3 mm. long; calyx 1 cm. long; lobes triangular, acute, equaling the tube; petals rose-purple, twice the length of the calyx; carpels stellate-pubescent on the summit, obovate, 3 mm. high.

This species was first discovered by Nuttall who considered it an undescribed species of *Malva*, but the name proposed by him over seventy years ago has never been published and now is not tenable. I therefore take pleasure in naming this long unrecognized but strikingly distinct species in honor of that acute observer and enthusiastic collector.

Type: Casitas Pass, Ventura County, *Abrams*, July 25, 1908. The type specimen is deposited in the Herbarium of Stanford University.

Distribution: Southern slopes of the Santa Ynez Mountains. Upper Sonoran.

Specimens examined: Foothills of the Santa Ynez Mountains, near Santa Barbara, *Elmer* 3730; *Franceschi*, Nov. 1909; *Greene*, July, 1886; Casitas Pass, *Abrams*, July 25, 1908.

3. *MALACOTHAMNUS DAVIDSONI* (Robinson) Greene, Leaflets 1: 208. 1906.

Malvastrum Davidsoni Robinson, in A. Gray, Syn. Fl. 1, pt. 1: 312. 1897.

Type locality: The type specimens were collected by Dr. A. Davidson in "San Fernando Valley."

Distribution: Robinson reports this species from Antelope and Bear Valleys as well as from the San Fernando Valley. The Bear Valley specimens cited by him I have not seen, but those from Antelope Valley (*Parish* 1955) belong to the next species. This species is known to me only from San Fernando Valley and the adjoining La Canada. Lower Sonoran.

Specimens examined: San Fernando, *Davidson*, May, 1893, and June 24, 1895; San Fernando wash, *Davidson*, 1907; Big Tejuanga wash, *Lyon*, Aug. 1884; La Canada, *Abrams* 1401.

4. *MALACOTHAMUS ORBICULATUS* Greene, Leaflets 1: 208. 1906.

Malvastrum orbiculatum Greene, Fl. Fran. 109. 1891.

Type locality: "In the mountains south of Tehachapi, Kern Co."

Distribution: On the desert slopes of the San Bernardino Mountains northward to the Tehachapi Mountains. Upper Sonoran.

Specimens examined: Near Griffens, Lockwood Valley, *Elmer* 3895; between Oakgrove Canyon, and Elizabeth Lake, *Abrams & McGregor* 405; Antelope Valley, *Parish* 1955; north slope of the San Bernardino Mountains, *S. B. & W. F. Parish* 139; Gold Mountain, *Abrams* 2070; Swartout Valley, San Gabriel Mountains, *Abrams & McGregor* 631; Acton, *Davidson*, July 4, 1892; Rock Creek, *Davidson*, July 4, 1893.

In addition to these four mainland species there is a fifth on the islands, *Malacothamnus nesioticus* (Robinson) = *Malvastrum nesioticum* Robinson, in A. Gray, Syn. Fl. 1, pt. 1: 312. 1897. This species is intermediate between *M. fasciculatus* and *M. Nuttallii*, having the leaf-outline of the latter, but with the upper surface green and nearly glabrous.

3. HIBISCUS. ROSE MALLOW.

1. HIBISCUS DENUDATUS Benth. Bot. Sulph. 7, pl. 3. 1844.

Type locality: "Bay of Magdalena."

Distribution: Dry gravelly ravines and slopes of the Colorado Desert, extending southward into northern Lower California, and eastward to El Paso. Lower Sonoran.

Specimens examined: Signal Mountain, Colorado Desert, *Abrams* 3178, and Dec. 29, 1907; Palm Springs, *Mrs. Hutchinson*, April, 1910.

STERCULIACEAE. STERCULIA FAMILY.

1. FREMONTODENDRON. CALIFORNIA SLIPPERY ELM.

1. FREMONTODENDRON CALIFORNICUM (Torr.) Coville, Cont. Nat. Herb. 4: 74. 1893.

Fremontia californica Torr. Pl. Frem. 5, pl. 2. 1853.

Chiranthodendron californicum Baill. Hist. Pl. 4: 70. 1873.

Type locality: "Sources of the Sacramento, in the northern part of the Sierra Nevada of California."

Distribution: Western slope of the Sierra Nevada and the more interior parts of the Coast Ranges, from the vicinity of Mt. Shasta south to the Cuiamaca Mountains. Higher altitudes of the Upper Sonoran and the lower parts of the Transition.

Specimens examined: Cuddy's ranch, *Rothrock* 278; San Ysabel, *Henshaw*, May 12, 1893; Lytle Creek Canyon, altitude 1250 meters, *Abrams* 2696; near Elizabeth Lake, *Abrams & McGregor* 404; Soldier's Camp, near Fort Tejon, *Abrams & McGregor* 272; Rock Creek, *Abrams & McGregor* 615.

FRANKENIACEAE. FRANKENIA FAMILY.

I. FRANKENIA. YERBA REUMA.

I. FRANKENIA PALMERI S. Wats. Proc. Am. Acad. 11: 124. 1876.

Type locality: "Lower California, upon the gulf side."

Distribution: Vicinity of San Diego, southward along the coast of Lower California, and on the adjacent islands. Lower Sonoran.

Specimens examined: National Rancho, near San Diego, *Cleveland*, May 11, 1880; borders of salt marshes, National City, *Pringle*, May 3, 1882; San Diego, *Herre*, Aug. 8, 1902.

Another species, *Frankia grandiflora*, which is a perennial, herbaceous plant, is abundant in low saline ground along the coast.

FOUQUIERACEAE. FOUQUIERA FAMILY.

I. FOUQUIERA. OCOTILLO.

I. FOUQUIERA SPLENDENS Engelm. in Wislitz. Mem. Tour. North Mex. 98. 1848.

Type locality: "From the Jornada del Muerto in New Mexico, to Chihuahua, Saltillo, and Monterey."

Distribution: Desert slopes of the Cuernavaca and San Jacinto Mountains, eastward to western Texas, and south through northern Mexico. Lower Sonoran.

Specimens examined: Near Signal Mountain, *Abrams* 3164.

CISTACEAE. ROCKROSE FAMILY.

I. HELIANTHEMUM. ROCK ROSE.

Petals 4-6 mm. long; calyx-lobes 3-5 mm. long in flower. 1. *H. scoparium*.
Petals 8-13 mm. long; calyx-lobes 6-7 mm. long in flower. 2. *H. Aldersoni*.

1. *HELIANTHEMUM SCOPARIUM* Nutt.; Torr. & Gray, Fl. N. Am.

1: 152. 1838.

Type locality: "Dry hills around Monterey, California."

Distribution: Northern California, southward to the vicinity of Los Angeles. Upper Sonoran.

Specimens examined: Bushy hillsides, near Los Angeles, *Hasse*, June 5, 1888; near Monrovia, *Dudley*, Dec. 16, 1907; Etiwanda, *Abrams* 2664; Lytle Creek Canyon, *Hall* 1409.2. *HELIANTHEMUM ALDERSONI* Greene, *Erythea* 1: 259. 1893.

Type locality: "Mountains of the southern border of San Diego Co. Calif. among rocks in hard and sterile granitic soil."

Distribution: Foothills on the coastal slope of the San Bernardino Mountains, southward to Lower California. Upper and Lower Sonoran.

This is perhaps best considered as a geographical variation of the former. It differs chiefly in being taller and having larger floral parts, characters that do not seem constant.

Specimens examined: Vicinity of San Bernardino, *Parish* 4837; foothills near San Bernardino, *Parish*, June 15, 1898; Dulzura, *Abrams* 3749; Potrero, *Susan G. Stokes*, July 19, 1895.**CACTACEAE. CACTUS FAMILY.**

Leaves present, but early deciduous, subulate; spines straight, sheathed; glochids present, retrorsely barbed and easily detached; stems conspicuously jointed.

1. *Opuntia*.

Leaves absent; spines hooked or straight, never sheathed; glochids always wanting; stems not jointed or if so not conspicuously; flowers borne on more or less vertical ribs.

Flowers nearly vertical arising from young areolae.

2. *Echinocactus*.

Flowers lateral, arising just above fully developed spine-bearing areolae.

Ovary scaly, nearly or quite destitute of spines; tall, columnar, tree-like plants.

3. *Carnegiea*.

Ovary and fruit spiny; stems slender-cylindric; flowers greenish-yellow; seeds not tuberculate.

4. *Bergerocactus*.

Only the larger or taller cacti which, on account of their size, have the appearance of shrubs, are included in this list.

1. *OPUNTIA. PRICKLY PEAR.*

Joints of the stems not flattened, cylindrical (except no. 4); spines sheathed.

Stems very slender; spines usually solitary in the areoles.

1. *O. ramosissima*.

Stems stout; spines several in each areole.

Fruit fleshy, sparsely or not at all spiny; flowers deep red.

Branches widely spreading; spine-sheaths yellowish or rusty.

2. *O. prolifera*.

Branches erect or ascending, forming close compact cluster above, at length becoming reflexed; sheath-spines bright-whitish.

3. *O. Bigelovii*.

Fruit dry and very spiny; flowers yellow or copper color.

Stems erect, with few alternate branches; spines very slender; flowers copper color.

4. *O. acanthocarpa*.

Stems diffusely branching; flowers yellow.

Joints ovate-clavate; fruit densely spiny.

5. *O. echinocarpa*.

Joints cylindrical.

Stems usually prostrate; areoles of ovary bearing several spines.

6. *O. californica*.

Stems erect and bushy; areoles of ovary bearing a single spine.

7. *O. bernardina*.

Joints of the stem flattened, narrowly obovate to suborbicular; spines not sheathed.

Fruit dry and spiny.

8. *O. hystricina*.

Fruit fleshy.

Spines brownish.

Flowers yellow.

9. *O. Covillei*.

Flowers magenta.

10. *O. magenta*.

Spines yellow.

Old trunks very spiny; seeds 2.5-3.5 mm. broad.

11. *O. chlorotica*.

Old trunks becoming spineless; seeds 5-6 mm. broad.

Areoles 35-50 mm. apart.

12. *O. occidentalis*.

Areoles 25 mm. apart.

13. *O. littoralis*.

1. OPUNTIA RAMOSISSIMA Engelm. Am. Journ.

Sci. II. 14: 339. 1852.

Opuntia tessellata Engelm. Proc. Am. Acad. 3: 309. 1856.

Type locality: "Gravelly soil near the Colorado, and in the desert." Collected by Dr. Parry on an expedition "from the sea-coast (San Diego) to the mouth of the Gila."

Distribution: Southern Nevada, southward to Sonora, and westward to the Mohave and Colorado Deserts. Lower Sonoran.

Specimens examined: Yuma, *Toumey*; Colorado Desert, *Sykes*.

2. OPUNTIA PROLIFERA Engelm. Am. Journ. Sci. II. 14: 338. 1852.

Type locality: "San Diego, on arid hills and in dry creek beds."

Distribution: A maritime species extending from the vicinity of San Pedro southward to San Diego, and probably into northern Lower California. Upper and Lower Sonoran.

Specimens examined: Mission Hills, San Diego, *Abrams* 3394.

3. *OPUNTIA BIGELOVII* Engelm. *Pacif. R. Rep.* 4: 50. 1856.

Distribution: Southern Nevada and Arizona, southward to the western slopes of the Colorado Desert. Lower Sonoran.

Specimens examined: Whitewater, *Rose*, 1908.

4. *OPUNTIA ACANTHOCARPA* Engelm. & Bigel. *Proc. Am. Acad.* 3: 308. 1856.

Type locality: "Mountains of Cactus Pass, between Santa Fe and the Western Colorado."

Distribution: Southern Utah and Nevada, southward through Arizona. Reported from Death Valley by Schumann. Lower Sonoran.

Specimens examined: near Campo, *Sykes*; Mammoth Tank, *Sykes*.

5. *OPUNTIA ECHINOCARPA* Engelm. & Bigel. *Proc. Am. Acad.* 3: 305. 1856.

Type locality: "In the valley of the Lower Colorado."

Distribution: Western Arizona, westward through the Mohave and Colorado Deserts, and southward into Sonora and Lower California. Lower Sonoran.

Specimens examined: Palm Springs, *Dudley*, Dec. 1902; Rock Creek, desert slope of the San Gabriel Mountains, *Abrams & McGregor* 564; Banning, *Toumey*, 1895; Barstow, *Shaller*.

6. *OPUNTIA CALIFORNICA* (Nutt.) Coville, *Proc. Biol. Soc. Wash.* 13: 119. 1899.

Opuntia serpentina Engelm. *Am. Journ. Sci.* II. 14: 338. 1852.
Cereus californica Nutt. in Torr. & Gray, *Fl. N. Am.* 1: 555. 1840.

Type locality: "Arid hills and denuded tracts near St. Diego, California, common."

Distribution: Dry mesas and foothills of southwestern San Diego County, southward into Lower California. Lower Sonoran.

Specimens examined: Tia Juana, *Abrams* 3474.

7. *OPUNTIA BERNARDINA* Engelm.; Parish, Bull.
Torrey Club 19: 92. 1892.

Type locality: "Dry hills and mesas from the Coast Range to the San Bernardino Mts., in the San Jacinto and San Bernardino Valleys."

Distribution: A characteristic plant of the interior valleys of southern California. It occurs in the vicinity of Newhall, in the San Fernando Valley, and is common in the San Bernardino and San Jacinto Valleys. Lower Sonoran.

Specimens examined: Cajon Pass, *Abrams & McGregor* 699; Elsinore, *Abrams*, July, 1908; Warner's Ranch, *Schaller*; Pala, *Schaller*.

8. *OPUNTIA HYSTRICINA* Engelm. & Bigel. Pacif. R. Rep. 4: 44,
pl. 15, f. 5-7. 1856.

Type locality: "At the Colorado Chiquito and on the San Francisco mountains."

Distribution: Western Texas, westward to southern Nevada, and Owen's Valley, California, according to Schumann. I have seen no specimens within our limits. Lower Sonoran.

9. *OPUNTIA COVILLEI* Britton & Rose, Smiths. Miscel. Coll. 50:
532. 1908.

Type locality: "San Bernardino, California."

Distribution: On the gravelly footslopes in the San Bernardino and San Jacinto Valleys, and occasionally along the desert bases of the San Gabriel Mountains. Lower Sonoran.

Specimens examined: Rock Creek, desert slope of the San Gabriel Mountains, *Abrams & McGregor* 558.

10. *OPUNTIA MAGENTA* Griffiths, Rep. Mo. Bot. Gard. 19: 268.
1908.

Type locality: "Near Redlands, California."

Distribution: This species seems to be confined to the foothills and footslopes around the San Bernardino Valley. I have not seen any specimens. Lower Sonoran.

11. *OPUNTIA CHLOROTICA* Engelm. & Bigel. Proc. Am.
Acad. 3: 291. 1856.

Type locality: "Western Colorado Country, between New Mexico and California, from the San Francisco Mountains to Mohave Creek."

Distribution: New Mexico, westward through Arizona and southern Nevada to the Mohave Desert, and southward to Sonora. I have not seen any southern California specimens. Lower Sonoran.

12. *OPUNTIA OCCIDENTALIS* Engelm. & Bigel. Proc.
Am. Acad. 3: 291. 1856.

Opuntia Engelmanni occidentalis Engelm. in Bot. Calif. 1: 248.
1876.

Opuntia Lindheimeri occidentalis Coult. Contr. Nat. Herb. 3: 421.
1896.

Type locality: "On the western slope of the California mountains, near San Diego and Los Angeles."

Distribution: The common prickly pear of the coast slope of southern California, often growing in dense thickets of considerable area. Upper and Lower Sonoran.

Specimens examined: Los Angeles, *Hasse 6169*; near Pasadena, *MacDougal*, 1906; Mesa Grande, *Schaller*; Pala, *Schaller*.

13. *OPUNTIA LITTORALIS* (Engelm.) Britton & Rose, Smiths.
Miscel. Coll. 50: 529. 1908.

Opuntia Engelmanni littoralis Engelm. in Bot. Calif. 1: 248. 1876.

Opuntia Lindheimeri littoralis Coult. Contr. Nat. Herb. 3: 422.
1896.

Type locality: "On the coast from Santa Barbara and the islands in its gulf to San Diego, and southward."

Distribution: Bluffs along the seashore of southern California, and on the islands off the coast. Upper Sonoran.

Specimens examined: Playa del Rey, *Abrams 2515*.

3. *ECHINOCACTUS*.

Stems simple, large, globose to cylindrical ("barrel-cactus"); ovary scales ovate orbicular; fruit not woolly.

Central spine 1; flowers purple.

1. *E. Emoryi*.

Central spines 4; flowers greenish-yellow.

Radial spines all stout and annulated.

Radial spines of 2 kinds; the lateral slender and flexuous, the dorsal and ventral slightly ribbed.

Stems numerous, often growing in mats; ovary-scales subulate; fruit densely woolly.

2. *E. cylindraceus*.

3. *E. Lecontei*.

4. *E. polycephalus*.

1. *ECHINOCACTUS EMORYI* Engelm. in Emory, Notes Mil.
Reconnois. 157. 1848.

Type locality: "Oct. 25, 1846." According to Emory's notes he was on the Gila River in the vicinity of San Carlos Creek on this date.

Distribution: Central and western Arizona, southward into Sonora and Lower California, and westward into southern California. This species was reported from the "Mohave region" in the Botany of California, but it is not certain that Bigelow's specimens were collected on the California side of the Colorado River. The species is to be expected, however, along the eastern border of the Mohave Desert and southward along the eastern borders of the State. Lower Sonoran.

2. *ECHINOCACTUS CYLINDRACEUS* Engelm. Pacif. R. Rep. 4: 32.
1856.

Echinocactus viridescens cylindraceus Engelm. Am. Journ. Sci. II.
14: 338. 1852.

Type locality: "Near San Felipe, on the eastern slope of the California mountains."

Distribution: Gravelly slopes and washes along the western border of the Colorado Desert. Lower Sonoran.

Specimens examined: Whitewater, Rose, 1908.

3. *ECHINOCACTUS LECONTEI* Engelm. Pac. R. Rep. 4: 29. 1856.
Echinocactus Wislizeni Lecontei Engelm. U. S. Geog. Surv. 6: 128.
1878.

Type locality: "First noticed by Dr. John L. LeConte, on the lower Gila."

Distribution: Southwestern Utah, westward to the eastern borders of southern California, and southward through western Arizona to Sonora. This species was observed by Bigelow "at the head waters of Williams River, down this stream to the Colorado, and west of it till *E. polycephalus* took its place." Coville

and Funston also report it from Surprise Canyon, in the Panamint Mountains. Lower Sonoran.

4. ECHINOCACTUS POLYCEPHALUS Engelm. Pac. R. Rep. 4: 31.
1856.

Type locality: "Stoney and gravelly hills and dry beds of torrents from 20 miles west of the Rio Colorado to about 150 miles westward up the Mohave."

Distribution: From the vicinity of Victor, northward to the Inyo Mountains, and eastward to southwestern Utah and western Arizona. Lower Sonoran.

Specimens examined: Barstow, *Rose*, 1908.

4. CARNEGIEA. GIANT CACTUS.

I. CARNEGIEA GIGANTEA (Engelm.) Britton & Rose, Journ.
N. Y. Bot. Gard. 9: 187. 1908.

Cereus giganteus Engelm. in Emory, Notes Mil. Reconnois. 159.
1848.

Pilocereus Engelmannii Lem. Ill. Hort. 9: Misc. 97. 1862.

Pilocereus giganteus Haage & Schmidt, Cat. 230. 1898.

Type locality: "Along the Gila River, about the middle of its course."

Distribution: The Giant cactus occurs through the southern part of Arizona and northern Sonora, and, according to Dr. D. T. MacDougal, it extends across the Colorado River into the borders of southern California in the vicinity of Ehrenburg. Lower Sonoran.

5. BERGEROCACTUS.

I. BERGEROCACTUS EMORYI (Engelm.) Britton & Rose, Contr.
Nat. Herb. 12: 474. 1909.

Cereus Emoryi Engelm. Am. Jour. Sci. II. 14: 338. 1852.

Type locality: "In thick patches, on dry hills near the sea shore about the boundary line," near San Diego, California.

Distribution: Vicinity of San Diego, southward into Lower California. Lower Sonoran.

Specimens examined: Tia Juana, *Abrams* 3473.

CORNACEAE. DOGWOOD FAMILY.

Flowers in aments, dioecious; stigmas lateral.

1. *Garrya*.

Flowers not in aments, perfect; stigmas terminal.

Flowers cymose, not subtended by an involucre.

2. *Svida*.

Flowers capitate, subtended by a large petaloid involucre.

3. *Cynoxylon*.

1. GARRYA. SILK-TASSEL TREE.

Pubescence on lower surface of leaves of tangled or matted hairs.

1. *G. Veatchii* Palmeri.

Pubescence on lower surface of leaves of upwardly appressed hairs.

2. *G. pallida*.

1. GARRYA VEATCHII PALMERI (S. Wats.) Eastwood, Bot.

Gaz. 36: 458. 1903.

Garrya flavescens Palmeri S. Wats. Bot. Gaz. 1: 276. 1876.

Garrya Veatchii undulata Eastwood, Bot. Gaz. 36: 458. 1903.

Type locality: "Milquatay, 60 miles from San Diego, on the Fort Yuma Road."

Distribution: In the chaparral belt of the mountains from Ventura County south to northern Lower California. Upper Sonoran.

Specimens examined: La Cumbre trail, Santa Ynez Mountains, *Abrams* 4308; Switzer's trail, San Gabriel Mountains, *Grinnell* 16; Arroyo Seco Canyon, San Gabriel Mountains, *Grinnell* 40; Sisar Canyon, Topatopa Mountains, *Abrams* & *McGregor* 64; Lytle Creek Canyon, *Abrams* 2805; Lone Pine Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 671.

2. GARRYA PALLIDA Eastwood, Proc. Calif. Acad. III. 2: 287. 1902.

Type locality: "Kings River Canyon," Kern County, California.

Distribution: Southern Sierra Nevada south to the Cuimaca Mountains. Upper Sonoran and lower altitudes of the Transition.

Specimens examined: Buckhorn Tavern, near Fort Tejon, *Abrams* & *McGregor* 283; La Cumbre Peak, Santa Ynez Mountains, *Abrams* 4318; Topatopa Mountains, *Abrams* & *McGregor* 104; Rock Creek, *Abrams* & *McGregor* 568; Cold Creek, San Bernardino Mountains, *Abrams* & *McGregor* 814; Mount Santiago, *Abrams* 1811; Middle Peak, Cuimaca Mountains, *Abrams* 3872.

2. SVIDA. Dogwood.

1. *Svida californica* (C. A. Mey.)

Cornus californica C. A. Mey. Bull. Phys.-Math. Acad. Petersb. 3: 372. 1845.

Cornus sericea occidentalis Torr. & Gray, Fl. N. Am. 1: 652. 1840.

Cornus pubescens californica Coulter & Evans, Bot. Gaz. 15: 37. 1890.

Cornus occidentalis Coville, Cont. Nat. Herb. 4: 117. 1893.

Type locality: "Hab. in litore occidentali Americae septentrionalis (Hooker), in California prope St. Francisco! (Cham.) et prope coloniam Ross!"

Distribution: Southern British Columbia and western Idaho, south to southern California. Upper Sonoran and Transition.

Specimens examined: Oak Knoll, Pasadena, *Grant* 217; Swart-out Canyon, San Gabriel Mountains, *Abrams & McGregor* 653; near Strawberry Peak, San Bernardino Mountains, altitude 1800 meters, *Abrams* 2009; western slope of San Jacinto Mountain, altitude 1800 meters, *Hall* 2233; Cuiamaca Mountains, *Palmer* 46; Palomar Mountain, *Parish* 4465; Grass Valley, San Bernardino Mountains, *Parish* 3105.

3. CYNOXYLON. FLOWERING DOGWOOD.

1. CYNOXYLON *NUTTALLII* (Audubon) Shafer, in Britton, N. Am. Trees 746. 1908.

Cornus Nuttallii Audubon; Torr. & Gray, Fl. N. Am. 1: 652. 1840.

Type locality: "Oregon."

Distribution: British Columbia and northern Idaho, extending southward to the mountains of southern California. Transition.

Specimens examined: Near Strawberry Peak, San Bernardino Mountains, altitude 1800 meters, *Abrams* 2016.

ERICACEAE. HEATH FAMILY.

Fruit capsular; anthers not appendaged.

Bracts thin, deciduous; leaf-buds scaly; leaves not heath-like.

1. *Azalea*.

Bracts firm, persistent; no scaly buds; leaves heath-like.

2. *Phyllodoce*.

Fruit a berry or berry-like drupe; anthers with dorsal, reflexed appendages; corolla urn-shaped.

Ovary 5-celled; ovules several to each cell.

3. *Arbutus*.

Ovary 5-10 celled; ovules 1 to each cell.

Ovary rugose or granular.

4. *Comarostaphylis*.

Ovary not rugose or granular.

Leaves dark green and glabrous above, tomentose beneath, not vertical.

5. *Xylococcus*.

Leaves similar on both surfaces, often vertical.

6. *Uva-ursi*.

1. AZALEA. AZALEA.

1. *AZALEA OCCIDENTALIS* Torr. & Gray, *Pacif. R. Rep.* 4: 116. 1857.

Rhododendron occidentale A. Gray, *Bot. Calif.* 1: 458. 1876.

Type locality: "Laguna de Santa Rosa, in low and wet ravines."

Distribution: Coast Ranges and Sierra Nevada, southward to the Cuiamaca Mountains in San Diego County. Transition.

Specimens examined: San Jacinto Mountains, in canyons on the west side, at 1800 meters, *Hall 2241*; Cuiamaca Mountains, altitude 1500 meters, *Susan G. Stokes*, July, 1895; *Abrams 3953*.

2. PHYLLODOCE.

1. *PHYLLODOCE BREWERI* (A. Gray) Heller, *Muhlenbergia* 1: 1. 1900.

Bryanthus Breweri A. Gray, *Proc. Am. Acad.* 7: 367. 1868.

Type locality: Of the several specimens cited, the first, which was collected by Brewer, was from "Woods Peak, Eldorado Co., California.

Distribution: Southern Cascade Mountains, southward through the higher altitudes of the Sierra Nevada to Mount San Gorgonio, San Bernardino Mountains. Canadian Zone.

Specimens examined: Mount San Gorgonio, *Abrams & McGregor 750*.

3. ARBUTUS. MADROÑO.

1. *ARBUTUS MENZIESII* Pursh, *Fl. Am. Sept.* 1: 282. 1814.

Type locality: "On the north-west coast of America."

Distribution: British Columbia, southward to the San Gabriel Mountains in southern California. Transition and extending into the Upper Sonoran.

Specimens examined: Mt. Wilson trail, altitude 1000 meters, *Abrams* 1515.

4. COMAROSTAPHYLIS.

1. *COMAROSTAPHYLIS DIVERSIFOLIA* (Parry) Greene, Bull. Calif. Acad. 2: 406. 1887.

Arctostaphylos arguta diversifolia Parry, Proc. Davenp. Acad. 4: 35. 1884.

Arctostaphylos diversifolia Parry; A. Gray, Syn. Fl. 2, ed. 2, pt. 1: 397. 1886.

Type locality: "In Jamul Valley." The first of several localities mentioned, and the only one from which flowering specimens were obtained.

Distribution: Santa Monica Mountains, southward to northern Lower California, and on the islands off the coast, as far northward as Santa Cruz Island. Upper and Lower Sonoran.

Specimens examined: Santa Cruz Island, *Grinnell*, Sept. 3, 1903; Topango Canyon, Santa Monica Mountains, *Hasse*, July 14, 1906.

5. XYLOCOCCLUS.

1. *XYLOCOCCLUS BICOLOR* Nutt. Trans. Am. Phil. Soc. II. 8: 259. 1843.

Comarostaphylos bicolor Klotzsch, Linnaea 24: 78. 1851.

Arctostaphylos bicolor A. Gray, Proc. Am. Acad. 7: 366. 1867.

Arctostaphylos Clevelandi A. Gray, Syn. Fl. 2, pt. 1: 29. 1878.

Type locality: "Hab. Monterey, Upper California." This is probably an error for the species is not known in the Monterey region. Nuttall's specimens no doubt came from San Diego.

Distribution: In the chaparral on the mesas and foothills of western San Diego County, southward to northern Lower California, also on the islands off the coast. Upper and Lower Sonoran.

Specimens examined: Cottonwood Grade, near Potrero, *Abrams* 3729.

6. UVA-URSI. MANZANITA OR BEARBERRY.

Pedicels and ovaries glabrous.

Stone solid, broadly ellipsoid, merely angled or ribbed; branchlets, inflorescence and young leaves canescent. 1. *U. Parryana*.

Stone lobed, depressed-globose, irregularly separable into nutlets.

Branchlets, inflorescence and young leaves canescent; leaves becoming dull-green. 2. *U. pungens*.

Branchlets and inflorescence with a golden resinous undument, or glandular pubescent; leaves bright yellowish-green.

3. *U. patula*.

Pedicels more or less pubescent or villous; ovaries pubescent or viscid.

Bracts firm, herbaceous or foliaceous; sepals ciliate on the margins, otherwise glabrous or puberulent.

Fruit ovoid, very viscid; stone solid, slightly ribbed; leaves very glaucous; branchlets glabrous or sometimes glandular-villous.

4. *U. glauca*.

Fruit depressed-globose, pubescent, not viscid; stone lobed and separable into irregular nutlets; pubescence of herbage variable.

5. *U. tomentosa*.

Bracts thin and scarious; sepals and herbage glandular-villous; stone solid, ovoid.

6. *U. drupacea*.

Dr. F. N. Williams (Journ. Bot. 48: 183, 184. 1910) has shown that *Uva-ursi* (Tourn.) Miller (Gard. Dict. 3. 1754) has priority over *Arctostaphylos* Adans. (Fam. 2: 163. 1763) and should replace it, according to the Vienna Rules.

1. *Uva-ursi Parryana* (Lemmon)

Arctostaphylos Parryana Lemmon, Pittonia 2: 68. 1890.

Type locality: "On the Tehachapi Mountains of south-central California, four miles west of Keene Station."

Distribution: Tehachapi Mountains and Mount Pinos, southward to Mount San Antonio. Transition and Upper Sonoran.

Specimens examined: Mount Pinos, altitude 2100 meters, *Abrams & McGregor 261*; *Elmer 3980*; Soldiers' Camp, near Fort Tejon, *Abrams & McGregor 281*; Coldwater Canyon, Mount San Antonio, altitude 2250 meters, *Abrams 2716*.

2. *Uva-ursi pungens* (H.B.K.).

Arctostaphylos pungens H.B.K. Nov. Gen. & Sp. 3: 278, pl. 259. 1818.

Daphnidostaphylos pungens Klotzsch, Linnaea 24: 80. 1851.

Type locality: "Crescit in Regio Mexicano, locis alsis, juxta Moran et Villalpando, alt. 1300-1400 hex."

Distribution: Southern California, southward to the mountains of Lower California and central Mexico. Upper Sonoran.

Specimens examined: Near Clark's ranch, San Bernardino Mountains, altitude 1500 meters, *Abrams 2936*; between Campo and Jacumba Hot Spring, *Abrams 3624*; Pine Valley, San Diego

County, *Mearns 3980*; West Fork of Deep Creek, San Bernardino Mountains, *Abrams & McGregor 721*.

3. *Uva-ursi patula* (Greene)

Arctostaphylos patula Greene, *Pittonia* 2: 171. 1891.

Type locality: "The common manzanita of dry rocky ridges in pine woods of middle altitudes in the Sierra Nevada, California, from Calaveras Co. southward to Fresno."

Distribution: Southern Cascade Mountains, southward to the San Jacinto Mountains. Transition.

Specimens examined: Strawberry Peak, San Bernardino Mountains, *Abrams 2019*; Tahquitz Valley, San Jacinto Mountains, altitude 2400 meters, *Hall 2419* (in part); between Dollar Lake and Hathaway Flat, San Bernardino Mountains, *Abrams & McGregor 804*.

4. *Uva-ursi glauca* (Lindl.)

Arctostaphylos glauca Lindl. *Bot. Reg.* 21: sub *pl.* 1791. 1836.

Type locality: "California, *Douglas*."

Distribution: Central California, southward to the southern boundary of the State. Upper Sonoran.

Specimens examined: Santa Ynez Mountains, *Elmer 3967*; Arroyo Seco Canyon, San Gabriel Mountains, *Grinnell 32, 37*; Mount Wilson trail, altitude 900 meters, *Abrams 1501*; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor 156*; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor 670*.

5. *Uva-ursi tomentosa* (Pursh)

Arbutus tomentosa Pursh, *Fl. Am. Sept.* 1: 282. 1814.

Arctostaphylos tomentosa Dougl. *Bot. Reg.* 21: *pl.* 7911. 1836.

Xerobotrys tomentosus Nutt. *Trans. Am. Phil. Soc.* II. 8: 268. 1843.

Type locality: "On the north-west coast of America."

Distribution: Southern British Columbia, southward to northern Lower California. In southern California this species grows in the higher altitudes of the Upper Sonoran and sometimes extends into the lower part of the Transition. There is great variation, especially in pubescence, and several well-marked forms seem to occupy distinct geographic areas. In the coastal mountains the

plants are usually setose-hispid and glandular-pubescent or glandular-villous. They are very much like Menzies' original specimens, and perhaps are also identical with *A. glandulosa* Eastw. The specimens I have cited from the Topatopa, the Liebre, and the San Bernardino Mountains are not at all glandular and are almost or entirely without setose hairs. The leaves are comparatively bright green, being only sparsely tomentose. In the Cuimaca Mountains, on the other hand, the plants have very pale foliage, which is more or less permanently canescent. The branches are without setose hairs, but are either canescent or glandular-pubescent.

Specimens examined: Santa Ynez Mountains, *Elmer* 3798; Mount Wilson trail, altitude 600 meters, *Abrams* 1500; Topatopa Mountains, *Abrams* & *McGregor* 84; Liebre Mountain, *Abrams* & *McGregor* 370; Cleghorn Canyon, San Bernardino Mountains, *Abrams* & *McGregor* 705; Mount Wilson trail, altitude 1000 meters, *Abrams* 1520; Los Tunas Canyon, Santa Monica Mountains, *Abrams* 1699; Silverado Canyon, Santa Ana Mountains, *Helen D. Geis* 723; between Julian and Banner, *Abrams* 3973; hills near Campo, *Abrams* 3620.

6. *Uva-ursi drupacea* (Parry)

Arctostaphylos Pringlei drupacea Parry, Bull. Calif. Acad. 2: 494. 1887.

Type locality: "Mountains east of San Diego."

Distribution: San Bernardino Mountains, southward to northern Lower California. Transition.

Specimens examined: Mill Creek Falls, 1600 meters, *Parish* 5070; Strawberry Peak, San Bernardino Mountains, *Abrams*, July 28, 1901; *Abrams* & *McGregor* 726; San Jacinto Mountains, altitude 1400 meters, *Hall* 2092; summit of Cuimaca Mountain, *Abrams* 3947; Cold Creek, San Bernardino Mountains, *Abrams* & *McGregor* 815.

STYRACACEAE. STYRAX FAMILY.

I. STYRAX. STORAX.

I. STYRAX CALIFORNICUM FULVESCENS Eastw. Bot.

Gaz. 41: 286. 1906.

Type locality: "Near the Painted cave in the Santa Ynez Mountains back of Santa Barbara, California."

Distribution: Santa Ynez Mountains and San Bernardino Mountains, in the upper portion of the chaparral belt. Upper Sonoran.

Specimens examined: Near Santa Barbara, *Bolander*, 1873; Santa Ynez Mountains, *Brandege*, 1888; foothills of the San Bernardino Mountains, *Clare E. Cummings*, May 1, 1896; foothills near San Bernardino, altitude 1800 meters, *Wright* 216; San Bernardino Mountains, altitude 800 meters, *Leiberg* 3324; *Vasey* 361; Waterman Canyon, *Shaw & Illingsworth* 14.

OLEACEAE. OLIVE FAMILY.

Fruit a samara; leaves usually pinnate.

1. *Fraxinus*.

Fruit not a samara; leaves entire.

Fruit a 2-parted membranous capsule; corolla yellow; low shrub.

2. *Menodora*.

Fruit a drupe; corolla none; arborescent shrub.

3. *Adelia*.

1. FRAXINUS. Ash.

Leaflets several.

Petals 2; leaflets rounded or obtuse at apex, 2-3 cm. long.

1. *F. dipetala*.

Petals none; leaflets acute or acuminate.

Body of the fruit equaling the wing in length; lateral leaflets sessile.

2. *F. oregana*.

Body of the fruit scarcely over half the length of the wing.

Leaves usually glabrous; lateral leaflets stalked.

3. *F. coriacea*.

Leaves tomentose-pubescent; lateral leaflets sessile.

4. *F. velutina*.

Leaflets only 1 or occasionally 3.

5. *F. anomala*.

1. *FRAXINUS DIPETALA* Hook. & Arn. Bot. Beech. 362, pl. 87. 1840.

Type locality: California, *Douglas*.

Distribution: Coast Ranges and foothills of the Sierra Nevada, south to southern California, where it is most frequent in the interior mountains. Upper Sonoran.

Specimen examined: Santa Ynez Mountains, *Elmer* 3822; Mill Creek, San Bernardino Mountains, *Parish* 5053; *Abrams & McGregor* 821; Sespe Creek, near Ten Sycamore Flat, *Abrams & McGregor* 175; Sulphur Mountain, *Abrams & McGregor* 37; Potrero Hills, near San Jacinto, *S. B. & W. F. Parish* 278; City Creek Canyon, San Bernardino Mountains, altitude 600 meters, *Leiberg* 3301.

2. *FRAXINUS OREGONA* Nutt. Sylva N. Am. 3: 59. 1849.

Fraxinus americana oregona Wesmael, Bull. Soc. Bot. Belg. 30: 110. 1892.

Type locality: "This is the only species of Ash we met with in the Oregon territory. . . . We never saw it above the falls of the Oregon."

Distribution: Puget Sound, southward through western Washington and Oregon to southern California. Upper Sonoran and Transition.

Specimens examined: San Gabriel River Canyon, *Abrams* 876.

3. *FRAXINUS CORIACEA* S. Wats. Am. Nat. 7: 30. 1873.

Type locality: "Ash Meadows, Nevada, and Devil's Run Canyon, Arizona."

Distribution: Southern Utah and Nevada to northern Arizona, and from the vicinity of Owen's Lake southward in the San Gabriel and San Bernardino Mountains, California. Upper Sonoran.

Specimens examined: Lytle Creek Canyon, altitude 800 meters, *Abrams* 2741; Liebre Mountains, *Abrams* & *McGregor* 400; Cajon Pass, *Abrams* & *McGregor* 692; Cleghorn Canyon, San Bernardino Mountains, *Abrams* & *McGregor* 703. (These specimens have narrower leaflets and much broader samaras than typical *coriacea*, and, on more extensive examination of material, may prove to be distinct.)

4. *FRAXINUS VELUTINA* Torr. in Emory, Notes Mil. Reconnois. 149. 1848.

Type locality: "In the region between the waters of the Del Norte and Gila; also on the Mimbres, a tributary of the latter river."

Distribution: Southern New Mexico and Arizona to southern California. Upper Sonoran.

Specimens examined: Between Campo and Jacumba Hot Spring, *Abrams* 3705; near Toro Mountain, altitude 1300 meters, *Leiberg* 3167.

5. *FRAXINUS AMOMALA* Torr.; S. Wats. Bot. King's Exped. 283. 1874.

Type locality: "In Labyrinth Canyon on the Colorado River, Utah," and "St. George on the Rio Virgen in the southwestern portion of the State."

Distribution: Southwestern Colorado, southern Utah and Nevada, southward to northern Arizona, and the Providence Mountains in southern California. Upper Sonoran.

Specimens examined: Providence Mountains, *Brandegee*, 1902.

2. MENODORA.

Shrubby, 6-10 dm. high, spinescent; herbage puberulent; corolla-lobes oblong, 3 mm. long.

1. *M. spinescens*.

Woody only at base, 3-4 dm. high, not spinescent; herbage glabrous; corolla-lobes ovate, 6-8 mm. long.

2. *M. scoparia*.

1. *MENODORA SPINESCENS* A. Gray, Proc. Am. Acad. 7: 388. 1867.

Type locality: "Canyons and hillsides of the southwestern part of the State of Nevada."

Distribution: Southern Nevada westward to Inyo County, California, and southward to the Providence Mountains. Lower Sonoran.

Specimens examined: Providence Mountains, *Cooper*, May 29, 1861.

2. *MENODORA SCOPARIA* Engelm.; A. Gray, Bot. Calif. 1: 471. 1876.

Menodora scabra glabrescens A. Gray, U. S. Geog. Surv. 6: 15. 1878.

Type locality: "Saltillo, Mexico."

Distribution: Northern Mexico and western Texas westward to the desert slopes of the southern California mountains. Lower Sonoran.

Specimens examined: Dry gravelly hills, Jacumba Hot Spring, *Abrams* 3641.

3. ADELIA.

1. *ADELIA NEO-MEXICANA* (A. Gray) Kuntze, Rev. Gen. Pl. 2: 410. 1891.

Forestiera neo-mexicana A. Gray, Proc. Am. Acad. 12: 63. 1876.

Forestiera acuminata parvifolia A. Gray, Proc. Am. Acad. 4: 364. 1859.

Adelia parvifolia Coville, Contr. Nat. Herb. 4: 148. 1893.

Type locality: "New Mexico; near Santa Fe, *Fendler*, no. 547. Below El Paso, *Wright*, no. 1699. Semelenque Springs, *Dr. Bigelow*."

Distribution: Western Texas and southern Colorado westward to the western extremities of the Mohave Desert in southern California. Upper and Lower Sonoran.

Specimens examined: Willow Springs, Antelope Valley, *Abrams & McGregor* 425; Rock Creek, east slope of the San Gabriel Mountains, altitude 1350 meters, *Abrams & McGregor* 566.

POLEMONIACEAE. PHLOX FAMILY.

1. LEPTODACTYLON.

Corolla salverform, 2.5-3 cm. long.

Herbage not glandular-pubescent.

1. *L. californicum*.

Herbage glandular-pubescent.

1a. *L. californicum glandulosum*.

Corolla funnelform, 1.5-2 cm. long.

Herbage glandular-pubescent; leaves alternate.

2. *L. Hookeri*.

Herbage not glandular-pubescent; leaves opposite.

3. *L. Hallii*.

1. *LEPTODACTYLON CALIFORNICUM* Hook. & Arn. Bot. Beech. 369. 1840.

Gilia californica Benth. in DC. Prod. 9: 316. 1845.

Type locality: California. Collected by Douglas probably near Monterey or Santa Barbara.

Distribution: In chaparral of the coast mountains from Santa Barbara northward to Monterey. Upper Sonoran.

Specimens examined: Santa Barbara, *Brandege*, no date.

1a. *Leptodactylon californicum glandulosum* (Eastw.).

Gilia californica glandulosa Eastw. Bot. Gaz. 37: 447. 1904.

Type locality: "The common form growing around Pasadena, California."

Distribution: In the chaparral belt of the mountains of southern California. Upper Sonoran.

Specimens examined: Near Pasadena, *Jones* 3209; La Canada, *Forbes*, May 2, 1902; Little Santa Anita Canyon, San Gabriel Mountains, *Abrams* 2624; Santa Ana Canyon, near Yorba, *Helen D. Geis*, April, 1902; Lytle Creek Canyon, altitude 600 meters, *Hall* 1413.

2. **LEPTODACTYLON HOOKERI** (Dougl.) Nutt. Journ. Acad. Philad. II. 1: 157. 1847.

Phlox Hookeri Dougl.; Hook. Fl. Bor. Am. 2: 73. pl. 159. 1838.

Gilia Hookeri Benth. in DC. Prod. 9: 316. 1845.

Gilia pungens Hookeri A. Gray, Proc. Am. Acad. 8: 268. 1870.

Gilia pungens eupungens var. *Hookeri* Brand. Pflanzenreich 4, Farn. 250: 126. 1907.

Type locality: "Hab. common on arid, sandy and rocky soils near the narrows of the Oakangen and Priest's Rapids of the Columbia."

Distribution: Southern British Columbia, southward through Washington and Oregon to southern California. Transition.

Specimens examined: Mount Pinos, *Elmer 3744*; near Green Valley, San Bernardino Mountains, *Hall 1064*; Bear Valley, *Parish 3683*; Snow Canyon, San Bernardino Mountains, *Parish 5059*.

3. **LEPTODACTYLON HALLII** (Parish) Heller, Muhlenbergia 1: 146. 1906.

Gilia Hallii Parish, Erythea 7: 94. 1899.

Gilia pungens Hallii Milliken, Univ. Calif. Pub. Bot. 2: 42. 1904.

Type locality: "Coyote Canyon, at 5,000 ft. alt. on the desert slope of El Toro Mt."

Distribution: Known only from the region of the type locality. Transition.

Specimens examined: Coyote Canyon, Santa Rosa Mountains, *Hall 2130*.

HYDROPHYLLACEAE. WATER-LEAF FAMILY.

I. ERIODICTYON. YERBA SANTA.

Herbage aromatic, not glandular-pubescent.

Leaves glutinous, nearly or quite glabrous at least above.

1. *E. trichocalyx*.

Leaves not glutinous, more or less densely silky-tomentose on both surfaces.

Corolla 8-12 mm. long, much exceeding the calyx.

2. *E. crassifolium*.

Corolla 2-3 mm. long, scarcely exceeding the calyx.

3. *E. Traskiae*.

Herbage very heavy-scented, glandular-pubescent throughout, not at all tomentose.

4. *E. Parryi*.

1. *ERIODICTYON TRICHOCALYX* Heller, *Muhlenbergia* 1: 108.
1904.

Eriodictyon glutinosum pubens A. Gray, *Proc. Am. Acad.* 17: 224.
1882.

Type locality: "Seven Oaks Camp, San Bernardino Mountains."

Distribution: Southern California from the San Gabriel Mountains south to the Mexican Boundary. Upper Sonoran.

Specimens examined: Mount Wilson, in chaparral near the summit, *Abrams* 2607; mesas near San Bernardino, *S. B. & W. F. Parish* 411; Mount San Antonio, altitude 1800 meters, *Abrams* 2685; Edgar Canyon, San Bernardino Mountains, *Parish* 2977; in chaparral between Campo and Jacumba Hot Spring, *Abrams* 3632; Mount Wilson, *Davidson*, June 12, 1892; Rock Creek, altitude 1140 meters, *Abrams & McGregor* 526.

2. *ERIODICTYON CRASSIFOLIUM* Benth. *Bot. Sulph.* 35. 1844.

Eriodictyon tomentosum Benth. *Bot. Sulph.* 36. 1844.

Type locality: "San Diego."

Distribution: In the chaparral of the foothills and mountains from Santa Barbara County southward to northern Lower California. Upper and Lower Sonoran. The form occurring in the Lower Sonoran, especially in Riverside and San Diego Counties, is much more silky-tomentose than the more northern Upper Sonoran form.

Specimens examined: Santa Ynez Mountains, near Santa Barbara, *Brandege*, 1888; Laurel Canyon, Santa Monica Mountains, *Hasse*, July, 1890; Glendora, *Braunton* 293; San Fernando Mountains near Chatsworth, *Abrams* 1363; Acton, *Elmer* 3598; Little Santa Anita Canyon, *Abrams* 2627; Newhall, *Davidson*, May 5, 1890; Fort Tejon, *Abrams & McGregor* 300; Sisar Canyon, Topatopa Mountains, *Abrams & McGregor* 65; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 142, 159; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor* 322; near Orange, *Agnes M. Bowman*, June, 1899; western base of San Jacinto Mountains, *Hall* 2006; San Jacinto, *Berg*, April 3, 1904; Witch Creek, *Alderson*, May, 1894; Mission Hills, near San Diego, *Abrams* 3432; Chollas Valley, *Susan G. Stokes*, June, 1895; San Diego, *Brandege*, 1889; Point Loma, *Chandler* 5067.

3. *ERIODICTYON TRASKIAE* Eastwood, Proc. Calif. Acad. III. 1: 121. 1898.

Type locality: "On one volcanic upland on Santa Catalina Island, Calif., at an elevation of about 1500 feet."

Distribution: Santa Ynez Mountains on the mainland, and Santa Catalina Island. Upper Sonoran.

Specimens examined: Santa Ynez Mountains, *Elmer* 4017; the Sisquoc, Santa Barbara County, *Baker*, July, 1895.

4. *ERIODICTYON PARRYI* (A. Gray) Greene, Pittonia 2: 22. 1889. *Nama Parryi* A. Gray, Bot. Calif. 1: 621. 1876.

Type locality: "On the Mohave slope of the San Bernardino Mountains."

Distribution: San Gabriel Mountains southward to the Cuimaca Mountains, and probably extending into northern Lower California. Transition.

This is an anomalous species, strikingly different in habit; the tall, mostly simple, herbaceous stems arise from a more or less woody, branching base.

Specimens examined: Mount Gleason, San Gabriel Mountains, *Elmer* 3643; open pine forests in the vicinity of Strawberry Valley, San Jacinto Mountains, *Hall* 2502; between Cuimaca and Oriflamme Canyon, Cuimaca Mountains, *Abrams* 3927; Rock Creek, altitude 1650 meters, *Abrams & McGregor* 577; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor* 386.

MENTHACEAE. MINT FAMILY.

Anther-bearing stamens 4.

Ovary merely 4-lobed; stamens coiled in the bud, becoming long-exserted in flower. 1. *Trichostema*.

Ovary deeply 4-parted; stamens not long-exserted.

Calyx becoming much inflated. 2. *Salazaria*.

Calyx not inflated. 3. *Sphacela*.

Anther-bearing stamens 2. 4. *Ramona*.

1. TRICHOSTEMA. BLUE-CURL.

Corolla-tube well-exserted beyond the calyx. 1. *T. lanatum*.

Corolla-tube scarcely exserted beyond the calyx. 2. *T. Parishii*.

1. TRICHOSTEMA LANATUM Benth. Lab. Gen. & Sp. 659. 1835.

Type locality: "Hab. in California." First collected by Douglas.

Distribution: On dry chaparral ridges from Monterey County

southward to Orange County. In southern California this species is confined to the mountains toward the coast from the Santa Ana Mountains northward. Upper Sonoran.

Specimens examined: Sierra Madre, *Nevin* 932; near Los Angeles, *Wallace*; Santa Monica Mountains, *Abrams* 1267; Santiago Canyon, Santa Ana Mountains, *Helen D. Geis*, May, 1902; Silverado Canyon, Santa Ana Mountains, *Helen D. Geis* 720 (a form with white instead of purple wool).

2. TRICHOSTEMA PARISHII Vasey, Bot. Gaz. 6: 173. 1880.

Trichostema lanatum denudatum A. Gray, Syn. Fl. 2, pt. 1: 459. 1886.

Type locality: "San Diego Co., Cal."

Distribution: On dry ridges of the more interior foothills and mountains of southern California, where it replaces the coastal and more northern *T. lanatum*. Upper Sonoran.

Specimens examined: Southern California, no locality given, *Vasey* & *Parish*, 1880; vicinity of San Bernardino, *Parish* 3645; Potrero, *Susan G. Stokes*, July, 1895; San Antonio Mountains, altitude 900 meters, *Hall* 1482; Lone Pine Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 666; Acton, *Elmer* 3698; Jacumba Hot Spring, *Mearns* 3352; between Jacumba Hot Spring and Campo, *Abrams* 3692.

2. SALAZARIA.

1. SALAZARIA MEXICANA Torr. Bot. Mex. Bound. 133. 1859.

Type locality: "Ravines, Chihuahua, below Presidio del Norte near the Rio Grande."

Distribution: Dry washes of the arid region, from the Mohave Desert of southern California eastward to southern Utah, and southward to northern Mexico. Lower Sonoran.

Specimens examined: Mill Creek Canyon, Panamint Mountains, *Coville* & *Funston* 756; southern slope of Tehachapi Pass, *Bran-degee*, July, 1884; *Abrams* & *McGregor* 494; Mohave Desert, *S. B. & W. F. Parish* 893; Mohave Desert, near Hesperia, *Parish* 4932; eastern base of the San Jacinto Mountains, along the borders of the Colorado Desert, *Hall* 2107.

3. SPHACELE. PITCHER SAGE.

I. SPHACELE FRAGRANS Greene, Pittonia 1: 38. 1887.

Sphacele calycina Wallacei A. Gray, Syn. Fl. 2, pt. 1: 365. 1878.

Type locality: "In canyons of the south side of Santa Cruz Island."

Distribution: On shady slopes in the foothills and mountains of the islands and on the mainland in the San Gabriel Mountains. Upper Sonoran.

Specimens examined: Santa Cruz Island, *Brandegee*, April, 1888; southern California, probably Santa Catalina Island, *Wallace*; Santa Catalina Island, *McClatchie*, Sept. 12, 1893; near Claremont, *Baker 5061*; Switzer's trail, San Gabriel Mountains, *Davidson*, June 12, 1893.

4. RAMONA.

Bracts scarious-membranous.

Leaves entire, not at all rugose.

Inflorescence villous; bracts less than 10 mm. long.

1. *R. pilosa*.

Inflorescence puberulent; bracts 15 mm. long.

2. *R. pachystachya*.

Leaves crenulate, rugose.

3. *R. capitata*.

Bracts herbaceous; leaves crenate, rugose.

Stems woody at base, scape-like, about 2 dm. high.

4. *R. humilis*.

Shrubs, 1-2 m. high.

Inflorescence verticillate-glomerate and interrupted-spicate; corolla-tube longer than the limb.

Corolla about 1 cm. long.

Bracts cuspidate-acuminate, somewhat tomentose.

5. *R. stachyoides*.

Bracts obtuse, hoary-tomentose.

6. *R. nivea*.

Corolla 2 cm. long.

Bracts acute or acute-cuspidate.

7. *R. Clevelandi*.

Bracts conspicuously aristate.

8. *R. Vaseyi*.

Inflorescence thyrsoïd-paniculate; corolla-tube shorter than the limb.

9. *R. polystachya*.1. *Ramona pilosa* (A. Gray).*Audibertia incana pilosa* A. Gray, Syn. Fl. 2, ed. 2, pt. 1: 461. 1886.

Type locality: "Northern base of San Bernardino Mountains, on the border of the Mohave Desert."

Distribution: Mohave Desert, chiefly in the juniper and yucca belts. Lower Sonoran.

Specimens examined: Northern base of the San Bernardino Mountains, Mohave Desert, S. B. & W. F. Parish 1309; Mohave Desert, about 1200 meters, Parish 3847; Acton, Hasse, May 21, 1893; Mescal Creek, Antelope Valley, Hall 3026; Mohave Desert, near Burcham's ranch, Parish 4935; Rock Creek, Abrams & McGregor 547; Palmdale, Abrams & McGregor 523.

2. *RAMONA PACHYSTACHYA* (A. Gray) Heller, Muhlenbergia 1: 4. 1900.

Audibertia incana pachystachya A. Gray, Syn. Fl. 2, ed. 2, pt. 1: 461. 1886.

Audibertia pachystachya Parish, Erythea 6: 91. 1898.

Salvia carnosa compacta Hall, Univ. Calif. Pub. Bot. 1: 111. 1902.

Type locality: "Bear Valley in the San Bernardino Mountains. Southern borders of San Diego Co."

Distribution: In the vicinity of Bear Valley, San Bernardino Mountains, and in the San Jacinto Mountains. Upper Sonoran and Transition.

Specimens examined: Eastern base of the San Jacinto Mountains, Hall 2160; Bear Valley, San Bernardino Mountains, Parry, 1876; Parish 330; The Pines, Santa Ana Canyon, altitude 1650 meters, Abrams & McGregor 523.

3. *RAMONA CAPITATA* (A. Gray) Briquet, Bull. Herb. Boiss. 2: 440. 1894.

Audibertia capitata A. Gray, Proc. Am. Acad. 7: 387. 1867.

Salvia mohavensis Greene, Pittonia 2: 235. 1892.

Type locality: "Summit of Providence Mountain, Mohave Desert."

Distribution: Known only from the type locality. Upper Sonoran.

4. *RAMONA HUMILIS* (Benth.) Greene, Erythea 1: 144. 1893.

Audibertia humilis Benth. Lab. Gen. & Sp. 313. 1833.

Salvia sonomensis Greene, Pittonia 2: 236. 1892.

Type locality: "Hab. in California septentrionali."

Distribution: Coast Ranges and Sierra Nevada of northern and central California, also in the Cuernamaca Mountains. This is merely a low herbaceous plant with a woody caudex. Transition.

Specimens examined: Cuimaca Mountain, *Brandegge*, June 15, 1894; between Cuimaca Lake and Oriflamme Canyon, *Abrams* 3938.

5. RAMONA STACHYOIDES (Benth.) Briquet, Bull. Herb.
Boiss. 2: 440. 1894.

Audibertia stachyoides Benth. Lab. Gen. & Sp. 313. 1833.

Salvia mellifera Greene, Pittonia 2: 236. 1892.

Type locality: "In California septentrionali."

Distribution: Santa Cruz and Mount Hamilton ranges southward to northern Lower California. In southern California this is one of the common and characteristic shrubs of the dry plains and foothills. It is commonly called "black sage," and is highly prized by bee-keepers. Upper Sonoran.

Specimens examined: Montecito, *Bingham* 30; Mission Canyon, Santa Barbara, *Abrams*, March 6, 1909; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2540; Pasadena, *McClatchie*, May 20, 1897; near Orange, *Miss Bowman*, June, 1899; plains near San Bernardino, *Parish* 4795; San Diego, *Palmer* 301; *Dunn*, March 21, 1891; *Miss Susan G. Stokes*, June, 1895; Point Loma, *Chandler* 5063; Big Tejunga wash, San Fernando Valley, *Abrams* 1391; Ramona, *Brandegge* (distributed by *C. F. Baker* 3410).

6. RAMONA NIVEA (Benth.) Briquet, Bull. Herb.
Boiss. 2: 440. 1894.

Audibertia nivea Benth. Lab. Gen. & Sp. 313. 1833.

Salvia leucophylla Greene, Pittonia 2: 236. 1892.

Type locality: "In California septentrionali."

Distribution: A common shrub on the low foothills from Santa Barbara County south to the Santa Ana Mountains. Upper Sonoran.

Specimens examined: Near Ojai, *Peckham*, 1866; Santa Barbara County, *Rothrock* 4, 133; *Bolander*, 1873; San Francisquito Canyon, *Parish*, June, 1887; Newhall, *Pringle*, May 20, 1882; *A. Gray*, May, 1885; Saugus, *Grant* 1105; Sulphur Mountain, *Abrams* & *McGregor* 13; Sespe Creek, near Ten Sycamore Flat, *Abrams* & *McGregor* 185.

7. RAMONA CLEVELANDI (A. Gray) Briquet, Bull. Herb.

Boiss. 2: 440. 1894.

Audibertia Clevelandi A. Gray, Proc. Am. Acad. 10: 76. 1874.

Salvia Clevelandi Greene, Pittonia 2: 236. 1892.

Audibertia Palmeri A. Gray, Bot. Calif. 1: 601. 1876.

Salvia Palmeri Greene, Pittonia 2: 236. 1892.

Ramona Palmeri Briquet, Bull. Herb. Boiss. 2: 440. 1894.

Type locality: "Mountains behind San Diego, California, at the elevation of about 2,200 feet."

Distribution: In the chaparral of western San Diego County and Santa Catalina Island, southward to northern Lower California. Upper Sonoran.

Specimens examined: Tigh's ranch, near Cuimaca, *Palmer 302*; San Juan Capistrano, *Nevin 686*; Santa Catalina Island, *Lyon 12*; near Potrero, *Abrams 3745*; Descanso, *Parish 4424*; near Ramona, *Abrams 3778*; near Valley Centre, *Chandler 5349*.

8. RAMONA VASEYI (Porter) Briquet, Bull. Herb. Boiss.

2: 440. 1894.

Audibertia Vaseyi Porter, Bot. Gaz. 6: 207. 1881.

Type locality: "Mountain Springs, San Diego County, California."

Distribution: Desert slopes of the mountains of southern California from Morongo Pass south to the Mexican Boundary. Lower Sonoran.

Specimens examined: Morongo wash, *Parish 3233*; Mountain Springs, *Vasey*, 1880.

9. RAMONA POLYSTACHYA (Benth.) Greene, Pittonia 2: 235.

1892.

Audibertia polystachya Benth. Lab. Gen. & Sp. 314. 1833.

Type locality: "In California septentrionali."

Distribution: Monterey County southward to northern Lower California. This is a very common shrub on the low hills and dry plains of southern California, and is commonly called "white sage." Upper and Lower Sonoran.

Specimens examined: Mountain Drive, near Santa Barbara, *Abrams 4125*; Acton, *Elmer 3684*; Sierra Madre, *Abrams 2642*; Claremont, *Baker 4155*; San Bernardino, *Parish 4796*; Coronado, *Chandler 5172*; San Diego, *Thurber 530*; *Palmer 300*; *Miss Susan*

G. Stokes, July, 1895; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor 147*; Rock Creek, altitude 1350 meters, *Abrams & McGregor 569*.

SOLANACEAE. NIGHTSHADE FAMILY.

Corolla rotate; stamens connivent.

1. *Solanum*.

Corolla tubular or funnelform; stamens not connivent.

Fruit a berry, sometimes becoming nearly dry.

2. *Lycium*.

Fruit capsular.

3. *Nicotiana*.

1. SOLANUM. NIGHTSHADE.

Corolla 5-cleft; peduncles longer than the pedicels. 1. *S. Douglasii*.

Corolla 5-toothed or 5-lobed; peduncles shorter than the pedicels.

Leaves entire; stems glabrate or viscid-pubescent.

Herbage viscid-pubescent.

2. *S. Xanti*.

Herbage glabrate or hispidulous.

2a. *S. Xanti glabrescens*.

Leaves crenate; stems long-hirsute.

3. *S. Wallacii*.

1. *SOLANUM DOUGLASII* Dunal, in DC. Prod. 13, pt. 1: 48. 1852.

Solanum nigrum Douglasii A. Gray, Bot. Calif. 1: 538. 1876.

Solanum umbelliferum trachycladum Torr. Pacif. R. Rep. 7: 17. 1856.

Type locality: "In Nova California."

Distribution: In the coastal region from Monterey southward to northern California. This native plant, more or less woody, and perennial, is clearly distinct from the European annual, *S. nigrum*, which occasionally appears as a wayside weed. Upper Sonoran.

Specimens examined: Playa del Rey, *Abrams 1216*; Inglewood, *Abrams 2488*; near Monrovia, *Dudley*, Dec. 1907; Sulphur Mountain, *Abrams & McGregor 23*; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor 690*.

2. *SOLANUM XANTI* A. Gray, Proc. Am. Acad. 11: 90. 1876.

Solanum Xanti intermedium Parish, Proc. Calif. Acad. III. 2: 168. 1901.

Type locality: Xantus' specimens were collected at Fort Tejon.

Distribution: Foothills of the Sierra Nevada, southward through southern California. Upper Sonoran.

Specimens examined: Cajon Pass, *Hall 3000*; Claremont,

Chandler, 1897; Mount Wilson, *Abrams* 2586; Campo, *Abrams* 3593; Sawpit Canyon, near Monrovia, *Dudley*, Dec. 18, 1907; Liebre Mountain, *Abrams & McGregor* 336; Rock Creek, *Abrams & McGregor* 597; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 154.

2a. *SOLANUM XANTI GLABRESCENS* (Torr.) Parish, Proc. Calif. Acad. III. 2: 169. 1901.

Solanum umbelliferum glabrescens Torr. Pacif. R. Rep. 7: 17. 1856.

Type locality: "Santa Ynez; also between San Bernardino and San Gabriel."

Distribution: Southern Oregon southward to Lower California and northern Arizona. Upper and Lower Sonoran.

Specimens examined: Dry hillsides near San Dieguito, *Abrams* 3362; Oceanside, *Parish* 4437; San Diego, *Palmer* 260; San Ysabel, *Henshaw*, April 9, 1893; La Mesa, *Chandler* 5059; Riverside, *Hall* 2929; San Bernardino, *Parish* 4384; between San Bernardino and San Gabriel, *Antisell*; Gaviota, *Elmer* 3957; vicinity of San Bernardino, *Parish* 4692; Lytle Creek Canyon, *Hall* 1224; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2556.

3. *SOLANUM WALLACEI* (A. Gray) Parish, Proc. Calif. Acad. III. 2: 166. 1901.

Solanum Xanti Wallacei A. Gray, Proc. Am. Acad. 11: 91. 1876.

Type locality: "Island of Catalina off San Pedro, California."

Distribution: Foothills of Santa Ynez Mountains and on the islands off the coast of southern California. Upper Sonoran.

Specimens examined: Santa Catalina Island, *Wallace*; Santa Barbara, *Wheelock*, Feb. 24, 1893; Bartlette Canyon, *Rothrock* 131; Mountain Drive, near Santa Barbara, *Abrams* 4139.

2. *LYCIUM*. BOX-THORN.

Herbage not glandular-pubescent.

Calyx-lobes lanceolate, exceeding the tube.

1. *L. Richii*.

Calyx-lobes oblong or triangular, shorter than the tube.

Corolla-tube short, not exceeding the calyx.

2. *L. californicum*.

Corolla-tube about 3 times the length of the calyx.

Herbage glabrous or nearly so; calyx-lobes triangular, much shorter than the tube.

Leaves mostly 2-3 cm. long; calyx-lobes tomentose on the margins; filaments woolly at base. 3. *L. Torreyi*.

Leaves mostly less than 1 cm. long; calyx-lobes glabrous or nearly so; filaments sparsely hairy at base.

4. *L. Andersonii*.

Herbage pubescent; calyx-lobes oblong, nearly equaling the tube.

5. *L. Parishii*.

Herbage glandular-pubescent; corolla more or less pubescent.

6. *L. Cooperi*.

1. *LYCIUM RICHII* A. Gray, Proc. Am. Acad. 6: 46. 1862.

Lycium Hassei Greene, Pittonia 1: 222. 1888.

Type locality: "La Paz, South California."

Distribution: On the islands off the coast of southern California, and also on the mainland in the vicinity of San Diego. Upper and Lower Sonoran.

Specimens examined: Santa Catalina Island, *Hasse*, July 15, 1888; San Diego, *Susan G. Stokes*, July, 1895.

2. *LYCIUM CALIFORNICUM* Nutt.; A. Gray, Bot. Calif. 1: 542. 1876.

Type locality: "Near San Diego on clay-hill slopes."

Distribution: On bluffs near the sea and occasionally in sub-alkaline soils in the interior of southern California and northern Lower California. Upper and Lower Sonoran.

Specimens examined: San Diego, *Nuttall*; *Palmer* 262; *Cooper*, March, 1862; San Pedro Hills, near Rocky Point, *Abrams* 3131; Wilmington, *Pringle*, March 31, 1882; Santa Monica, *Parry* 216; near Acton, *Elmer* 3757; Laguna Beach, *Helen D. Geis* 581.

3. *LYCIUM TORREYI* A. Gray, Proc. Am. Acad. 6: 47. 1862.

Type locality: "Texas on the Rio Grande, to Fort Yuma, interior of California, along the Mexican boundary."

Distribution: Southern Utah, southward to western Texas, Chihuahua and Sonora. Lower Sonoran.

Specimens examined: Fort Yuma, *Thomas*, March 3, 1855.

4. *LYCIUM ANDERSONII* A. Gray, Proc. Am. Acad. 7: 388. 1867.

Lycium Andersonii Wrightii A. Gray, Bot. Calif. 1: 543. 1876.

Type locality: "S. E. part of State of Nevada."

Distribution: Southern Arizona and southern California on the Colorado Desert and in the vicinity of San Diego. Lower Sonoran.

Specimens examined: San Diego, *Jones*, April 5, 1882; *Abrams* 3464; Tia Juana, *Abrams* 3491; Morongo Pass, S. B. & W. F. *Parish* 11-a; Palm Springs, *Parish* 4132; Mohave River, *Palmer*, May, 1876; Elsinore, *Baker*, 4145; Vallecitos, *Brandege*, April 10, 1896.

5. *LYCIUM PARISHII* A. Gray, Proc. Am. Acad. 20: 305. 1884.

Type locality: "Mesas in San Bernardino Valley, S. California."

Distribution: This was described from a single bush which according to Mr. Parish has since been destroyed. The species has never been rediscovered. Lower Sonoran.

Specimens examined: Mesa south of San Bernardino, *Parish*, May, 1885.

6. *LYCIUM COOPERI* A. Gray, Proc. Am. Acad. 7: 388. 1867.

Lycium Cooperi pubiflora A. Gray, Syn. Fl. 2, pt. 1: 238. 1878.

Type locality: "East slope of Providence Mountain, in the Mohave District, California."

Distribution: Mohave and Colorado Deserts, eastward to Arizona. Lower Sonoran.

Specimens examined: Between Calexico and Signal Mountain, on the International Boundary, *Abrams* 3149; Palmdale, *Elmer* 3661; Victor, *Palmer* 223½; Mohave Desert, *Pringle*, May 18, 1882.

3. *NICOTIANA*. TOBACCO.

1. *NICOTIANA GLAUCA* R. Grah. Edinb. N. Phil. Journ. 175. 1828.

Type locality: "It was raised in 1827 from seeds communicated, without specific name, to the Royal Botanical Garden, Edinburgh, by Mr. Smith at Monkwood, whose son sent them from Buenos Ayres."

Distribution: The tree-tobacco, which is naturalized from South America, is frequent in waste places and along dry washes of streams, often found extending well up into the canyons. Upper and Lower Sonoran.

Specimens examined: Gaviota, *Elmer* 3997; Santa Ana, *Agnes M. Bowman*, April, 1899; Tia Juana, *Susan G. Stokes*, June, 1895.

SCROPHULARIACEAE. FIGWORT FAMILY.

Stamens 4, the fifth represented by a sterile filament.

1. *Pentstemon*.

Stamens 4, the fifth wholly wanting.

2. *Diplacus*.

1. PENTSTEMON. BEARD-TONGUE.

Corolla red; tube elongated, narrow; limb strongly bilabiate; leaves serrate or denticulate.

Leaves ovate; scandant over shrubs.

1. *P. cordifolius*.

Leaves linear-lanceolate, remote and often ternate on the virgate, herbaceous branches.

2. *P. ternatus*.

Corolla yellow or tinged with purple; tube short.

Leaves entire; sterile filament densely bearded.

3. *P. antirrhinoides*.

Leaves few-toothed; sterile-filament not bearded.

Stems and leaves puberulent.

4. *P. jacintensis*.

Stems and leaves glabrous.

5. *P. breviflorus*.

1. PENTSTEMON CORDIFOLIUS Benth. Scroph. Ind. Introd. 7. 1835.

Type locality: "A new California species collected by Mr. Douglas."

Distribution: Common in the chaparral belt, from Santa Barbara County to northern Lower California; also on the islands off the coast. Upper Sonoran.

Specimens examined: California, probably Santa Barbara, *Douglas*; Santa Barbara, *Rich*; *Elmer* 3956; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2545; Claremont, *Baker* 3441; Los Tunas Canyon, Santa Monica Mountains, *Abrams* 1694; foothills, of the San Bernardino Mountains, *Parish*, July 8, 1898; Lytle Creek Canyon, *Hall*, June 17, 1899; Jamul Valley, *Palmer* 273; Cottonwood Valley, *Abrams* 3905; Sycamore Canyon, San Diego County, *Chandler* 5328; Mission Valley, *Susan G. Stokes*, June, 1895; Alpine, San Diego County, *Mearns* 3940; near Pasadena, *Grinnell*, July 3, 1903; Santa Monica Canyon, *Abrams* 1468; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 150.

2. PENTSTEMON TERNATUS Torr. Bot. Mex. Bound. 2: 115. 1859.

Type locality: "Mountains east of San Diego."

Distribution: Chaparral belt of the interior mountains of southern California. Upper Sonoran.

Specimens examined: Vicinity of Fort Tejon, *Xantus* 63; Acton, *Elmer* 3597; Pasadena, *McClatchie*, June 28, 1893; Waterman Canyon, San Bernardino Mountains, *Hall*, July 13, 1899; foothills, San Bernardino Mountains, *Parish*, June 1, 1898; Clark's ranch, San Bernardino Mountains, *Abrams* 2939; mountains east of San Diego, *Parry*, 1850 (type); Potrero, *Susan G. Stokes*, July, 1895; *Abrams* 3726; Claremont, *Baker* 5967; Julian, *Palmer* 274; Palomar Mountains, *Chandler* 5441; Chalk Hill, San Jacinto Mountains, *Hall* 2634; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor* 394; Cajon Pass, *Abrams & McGregor* 698.

3. *PENTSTEMON ANTIRRHINOIDES* Benth.; A. DC. Prod. 10: 594-1846.

Type locality: "In California." First collected by Coulter.

Distribution: In the chaparral of the low foothills and plains, from the vicinity of San Bernardino and the Santa Ana Mountains, southward to northern Lower California. Lower and Upper Sonoran.

Specimens examined: Colton, *Jones* 3178; near San Bernardino, *Parish*, May 26, 1898; Reche Canyon, *Hall*, May 17, 1899; Elsinore, *McClatchie*, May 20, 1893; near San Jacinto, *Leiberg* 3220; *Foster*, *Hall* 3879; San Miguel Mountain, *Chandler* 5273; Potrero, *Abrams* 3712; near Fallbrook, *Abrams* 3347; San Ysabel, *Henshaw* 146; Silverado Canyon, Santa Ana Mountains, *Helen D. Geis* 735; canyon of the San Jacinto River, *Hall* 2016, June, 1901.

4. *PENTSTEMON JACINTENSIS* Abrams, Bull. Torrey Club 33: 445. 1906.

Type locality: "San Jacinto Mountain, altitude 9,000 feet."

Distribution: Open pine forests of the San Jacinto Mountains. Transition.

Specimens examined: San Jacinto Mountain, *S. B. & W. F. Parish* 473; *Hall* 704; Tahquitz Valley, *Hall* 2588; *F. Grinnell*, July, 1908.

5. *PENTSTEMON BREVIFLORUS* Lindl. Bot. Reg. **23**: pl. 1946.
1837.

Type locality: Collected by Douglas, probably near Monterey.

Distribution: Foothills of the Coast Ranges and the Sierra Nevada in Central California, extending southward to the Liebre Mountains in southern California. Upper Sonoran.

Specimens examined: Between Oakgrove Canyon and Elizabeth Lake, *Abrams & McGregor* 409.

2. *DIPLACUS*. BUSH MONKEY-FLOWER.

Flowers yellow or buff.

Corolla-tube much exceeding the calyx; lobes not erose-toothed; calyx and leaves not pubescent.

1. *D. aridus*.

Corolla-tube proper not exceeding the calyx; lobes erose-toothed; leaves pubescent beneath; calyx usually woolly.

2. *D. longiflorus*.

Flowers scarlet; corolla-lobes not erose-toothed; calyx glabrous.

3. *D. puniceus*.

1. *DIPLACUS ARIDUS* Abrams, Bull. Torrey Club **32**: 540. 1905.

Type locality: "Growing on dry rocky ridges at Jacumba near the boundary monument."

Distribution: Desert slopes of the Cuiamaca Mountains near the International Boundary. Upper Sonoran.

Specimens examined: Jacumba Hot Spring, *Abrams* 3656.

2. *DIPLACUS LONGIFLORUS* Nutt. Ann. Nat. Hist. **1**: 139. 1838.

Mimulus glutinosus brachypus A. Gray, Bot. Calif. **1**: 566. 1876.

Diplacus arachnoideus Greene, Bull. Calif. Acad. **1**: 210. 1885.

Diplacus calycinus Eastw. Bot. Gaz. **41**: 287. 1906.

Type locality: "In rocky places by small streams, in the vicinity of Sta. Barbara (Upper California)."

Distribution: Southern Sierra Nevada and Santa Barbara County, southward to northern Lower California. Upper Sonoran.

The form with a glabrous calyx, which occurs in San Diego County, may be distinct, but the genus needs a thorough revision before more forms are segregated.

Specimens examined: Santa Barbara, *Elmer* 3959; Mission Canyon, near Santa Barbara, *Eastwood* 19; Los Angeles, *Hasse*, Oct. 1887; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2543; vicinity of San Bernardino, *Parish* 4792; Ysidora, *Abrams* 3287; between Campo and Potrero, *Abrams* 3716.

3. *DIPLACUS PUNICEUS* Nutt. Ann. Nat. Hist. 1: 137. 1838.*Diplacus glutinosus puniceus* Benth. DC. Prod. 10: 368. 1844.*Mimulus glutinosus puniceus* A. Gray, Bot. Calif. 1: 566. 1876.

Type locality: "In sandy loam by the borders of small winter streams, attaining commonly the height of a man, growing near to Sta. Diego, in Upper California."

Distribution: Riverside County and the Santa Ana Mountains, southward to northern Lower California, also on the islands off the southern California coast. Upper and Lower Sonoran.

Specimens examined: Vicinity of Riverside, *Hall* 2928; San Diego, *Palmer* 283; *Thurber* 545; San Luis Rey River, *Parish* 4461; Palomar Mountain, *Hall*, May 31, 1899; Ysidora, *Abrams* 3285; Mission Hills, San Diego, *Hall* 5053; Fallbrook, *Jones* 3439.

ACANTHACEAE. ACANTHUS FAMILY.

1. BELOPERONE.

1. *BELOPERONE CALIFORNICA* Benth. Bot. Sulph. 38. 1844.*Jacobina californica* Nees, DC. Prod. 11: 729. 1847.*Seriocographis californica* A. Gray, in Torr. Bot. Mex. Bound. 125. 1859.

Type locality: "Cape San Lucas," Lower California.

Distribution: Colorado Desert of southern California, southward through the desert regions of Lower California. Lower Sonoran.

Specimens examined: Palm Springs, *Parish* 4136; Coyote Canyon, altitude 200 meters, *Hall* 2767; Vallecitos, Colorado Desert, *Brandegge*, March 26, 1901; near Coachella, *Hall* 5776.

BIGNONIACEAE. TRUMPET-CREEPER FAMILY.

1. CHILOPSIS. FLOWERING WILLOW.

1. *CHILOPSIS LINEARIS* (Cav.) Sweet, Hort. Brit. 283. 1827.*Bignonia linearis* Cav. Ic. 3: 35, pl. 269. 1794.*Chilopsis saligna* Don. Edinb. Phil. Journ. 9: 261. 1823.

Type locality: Not given.

Distribution: Mohave Desert, southward and eastward to western Texas and Mexico. Growing along dry washes and stream

beds of the desert mountains. In southern California extending into the coastal slope through the Morongo Pass. Lower Sonoran.

Specimens examined: Eastern base of San Jacinto Mountain, *Hall 2112*; Warner's ranch, San Diego County, *Susan G. Stokes*, Aug. 1895; Cushenberry Springs, north slope of San Bernardino Mountains, *Abrams 2142*; San Felipe, *Abrams 3979*.

CAPRIFOLIACEAE. HONEYSUCKLE FAMILY.

Leaves pinnate; corolla rotate.

1. *Sambucus*.

Leaves simple.

Corolla short-campanulate, regular; berry white.

2. *Symphoricarpus*.

Corolla tubular, irregular; berry red or black.

3. *Lonicera*.

I. SAMBUCUS. ELDER.

Fruit without bloom.

1. *S. mexicana*.

Fruit with a glaucous bloom.

Herbage pubescent.

2. *S. velutina*.

Herbage glabrous.

3. *S. coerulea*.

1. SAMBUCUS MEXICANA Presl.; DC. Prod. 4: 322. 1830.

Type locality: "In Mexico."

Distribution: Southern California to Texas and south through Mexico and Costa Rica, according to Schwerin. I have not seen any specimen that can be referred to this species with certainty. but fruiting material has been seldom collected, and it may be that some of the material referred to the next species belongs here.

*2. SAMBUCUS VELUTINA Dur. & Hilg. Pacif. R. Rep. 5: 8. 1855, *Sambucus coerulea velutina* Schwerin, Mitt. Deutsch. Dendr. Ges. 1909: 37, 328. 1909.

Type locality: "Pose Creek," Kern County, California.

Distribution: Southern Sierra Nevada and the mountains of southern California. The herbage is usually densely pubescent, but occasionally nearly glabrous forms occur. Upper Sonoran and Transition.

Specimens examined: Bear Valley, San Bernardino Mountains, *Hall 1347*; Mount San Antonio, altitude 2400 meters, *Abrams 2710*;

*After this paper went to the printer Greene (Leaflets 2: 99) described several new species of *Sambucus*, one of which, *Sambucus coriacea*, is the pubescent form in the foothills of Santa Barbara and Ventura Counties. I had tentatively referred these plants to *S. velutina*.

Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 493; Rock Creek, San Gabriel Mountains, altitude 1800 meters, *Abrams & McGregor* 596; Santa Barbara, *Elmer* 3836; Sulphur Mountain, *Abrams & McGregor* 6; Red Reef Canyon, Topatopa Mountains, *Abrams & McGregor* 139.

3. *SAMBUCUS COERULEA* Raf. Alsog. Am. 48. 1838.

Sambucus glauca Nutt. in Torr. & Gray, Fl. N. Am. 2: 13. 1841.

Type locality: "Mentioned by Lewis and Clarke trav. 2, p. 160 as growing near Origen Mts."

Distribution: Idaho and Washington, southward through western Nevada and California to northern Lower California. In southern California this elder is common in the foothills and in both the coastal and interior valleys. Upper Sonoran.

Specimens examined: Vicinity of San Bernardino, *Parish*, 1898; Chatsworth, *Abrams* 1326; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 2538; Oneonta, *Chandler* 5117; Jamacha, *Chandler* 5254; Fort Tejon, *Abrams & McGregor* 299; Oakgrove Canyon, Liebre Mountains, *Abrams & McGregor* 329; Swartout Canyon, San Gabriel Mountains, *Abrams & McGregor* 630; Lone Pine Canyon, San Gabriel Mountains, *Abrams & McGregor* 686; Tia Juana River, near the initial monument, *Herre*, Aug. 8, 1902.

2. *SYMPHORICARPUS* Dill. SNOWBERRY.

Corolla short-campanulate, lobes equaling the tube.

1. *S. mollis*.

Corolla tubular-funnelform, lobes shorter than the tube.

2. *S. Parishii*.

1. *SYMPHORICARPUS MOLLIS* Nutt. in Torr. & Gray, Fl. N. Am. 2: 4. 1841.

Symphoricarpus ciliatus Nutt. in Torr. & Gray, Fl. N. Am. 2: 4. 1841.

Type locality: "St. Barbara, California."

Distribution: Coast ranges and foothills of the Sierra Nevada of central California, southward to the Cuiamaca Mountains. Upper Sonoran.

Specimens examined: Santa Barbara *Nuttall*; *A. Gray*, 1885; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 347, 2552; Spencer Valley, near Julian, *Abrams* 3785; Mount Wilson, *Grant* 1260.

2. SYMPHORICARPUS PARISHII Rydb. Bull. Torrey Club 26:
545. 1899.

Type locality: "San Bernardino Mountains."

Distribution: San Gabriel Mountains, southward to the San Jacinto Mountains. Transition and Canadian Zones.

Specimens examined: Bear Valley, San Bernardino Mountains, *Abrams 2081*; Tamarack Valley, altitude 2700 meters, San Jacinto Mountains, *Hall 2485*; Swartout Canyon, San Gabriel Mountains, altitude 1950 meters, *Abrams & McGregor 638*; Dry Lake, San Bernardino Mountains, altitude 2700 meters, *Abrams & McGregor 787*.

3. LONICERA. HONEYSUCKLE.

Flowers in terminal clusters.

Inflorescence pubescent.

Uppermost leaves connate.

Leaves all distinct.

Leaves tomentose beneath.

Leaves nearly or quite glabrous and green beneath.

Inflorescence glabrous.

Flowers on axillary peduncles, in pairs.

1. *L. hispidula californica*.

2. *L. subspicata*.

2a. *L. subspicata denudata*.

3. *L. interrupta*.

4. *L. Ledebourii*.

1. LONICERA HISPIDULA CALIFORNICA (Torr. & Gray) Rehder,
Rep. Mo. Bot. Gard. 14: 178. 1903.

Lonicera californica Torr. & Gray, Fl. N. Am. 2: 7. 1841.

Caprifolium californicum K. Koch, Hort. Dendr. 294. 1853.

Lonicera hispidula vacillans A. Gray, Proc. Am. Acad. 8: 628.
1873.

Caprifolium hispidulum californicum Greene, Fl. Fran. 347. 1892.

Type locality: "At San Francisco, Douglas."

Distribution: British Columbia southward to the Sierra Nevada and Coast Ranges of central California. This species is not known on the mainland in southern California, but a form with "the inflorescence densely glandular-pubescent" has been collected on Catalina Island by Blanche Trask, according to Rehder.

2. LONICERA SUBSPICATA Hook. & Arn. Bot. Beechy 349. 1840.

Caprifolium subspicatum K. Koch, Hort. Dendr. 294. 1853.

Lonicera hispidula subspicata A. Gray, Proc. Am. Acad. 8: 628.
1873.

Type locality: "California." First collected by Douglas, probably at Santa Barbara.

Distribution: Santa Barbara and Fort Tejon southward to the Santa Ana and San Jacinto Mountains. This is the common species in the chaparral of the coastal slope. Upper Sonoran.

Specimens examined: Santa Barbara, *Douglas*; *Nuttall*; Bartlett Canyon, Santa Ynez Mountains, *Rothrock* 124; Mountain Drive, near Santa Barbara, *Abrams* 4148; near Santa Barbara, *Elmer* 3729; Sepulveda Canyon, Santa Monica Mountains, *Abrams* 367, Strawberry Valley, San Jacinto Mountains, *Hall* 2529; near Santa Ana, *Helen D. Geis* 518; Arroyo Seco, near Pasadena, *Grinnell*, June 27, 1903; Sawpit Canyon, San Gabriel Mountains, *Dudley*, Dec. 1907; Fort Tejon, *Abrams* & *McGregor* 309; Cleg-horn Canyon, San Bernardino Mountains, *Abrams* & *McGregor* 704; Waterman Canyon, San Bernardino Mountains, *Shaw* & *Illingsworth* 9, 226.

2a. *LONICERA SUBSPICATA DENUDATA* Rehder, Rep. Mo. Bot. Gard. 14: 176. 1903.

Type locality: "San Diego," and also "Santo Thomas hills," Lower California.

Distribution: Foothills of San Diego County southward into Lower California. Upper Sonoran.

Specimens examined: San Diego, *Thurber* 558 (type); *Susan G. Stokes*, July 10, 1895; Spencer Valley, near Julian, *Abrams* 3804 (a form approaching the type); Chollas Valley, *Orcutt* 120.

3. *LONICERA INTERRUPTA* Benth. Pl. Hartw. 313. 1849.

Lonicera hispidula interrupta A. Gray, Proc. Am. Acad. 8: 628. 1873.

Caprifolium interruptum Greene, Fl. Fran. 347. 1892.

Type locality: "Juxta carmel prope Monterey."

Distribution: Northern Coast Ranges and the Sierra Nevada southward to the desert slopes of the San Gabriel Mountains.

Specimens examined: Newhall, *Hasse* 605; Red Reef Canyon, Topatopa Mountains, *Abrams* & *McGregor* 136; Oakgrove Canyon, Liebre Mountains, *Abrams* & *McGregor* 326, 395; Swartout Canyon, San Gabriel Mountains, *Abrams* & *McGregor* 629.

4. *LONICERA LEDEBOURII* Esch. Mem. Acad. Sci. Petersb. 10: 284. 1826.

Chamaecerasus Ledebourii Billiard, L'Hort. Franc. 1861: 256. 1861.

Lonicera intermedia Kell. Proc. Calif. Acad. 1: 154. 1863.

Caprifolium Ledebourii Kuntze, Rev. Gen. Pl. 1: 274. 1891.

Distegia Ledebourii Greene, Man. Bot. Bay Reg. 164. 1894.

Xylosteum Ledebourii Howell, Fl. N. W. Am. 1: 282. 1900.

Lonicera involucrata Ledebourii Hort.; Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 461. 1903.

Type locality: Collected by Eschscholtz, probably in the vicinity of San Francisco.

Distribution: In moist shady places along streams; Santa Barbara northward through the Coast ranges and along the western slope of the Sierra Nevada to northern California. Transition and Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer 4138*.

AMBROSIACEAE. RAGWEED FAMILY.

Involucre of pistillate heads with broad silvery scarious wings.

1. *Hymenoclea*.

Involucre of pistillate heads armed with several rows of prickles.

2. *Gaertneria*.

1. HYMENOCLEA.

Involucral bracts of pistillate heads spirally alternate, 5 mm. broad.

1. *H. Salsola*.

Involucral bracts of pistillate heads in a single whorl, 1-2 mm. broad.

2. *H. monogyra*.

1. HYMENOCLEA SALSOLA Torr. & Gray, Pl. Fendl. 79. 1849.

Type locality: "Sandy, saline uplands near the Mohave River, in the interior desert of California." Transition and Upper Sonoran.

Distribution: A common shrub in the sandy washes throughout the desert region. Lower Sonoran.

Specimens examined: Palmdale, *Elmer 3622*; Mohave Desert, *Brandegee*; Whitewater, *Vasey*, Feb., 1881; Palm Springs, *Parish 4123*; San Felipe, *Vasey*, June, 1880; Rock Creek, *Abrams & McGregor 542*; Willow Springs, *Abrams & McGregor 422*.

2. HYMENOCLEA MONOGYRA Torr. & Gray, Pl. Fendl. 79. 1849.

Type locality: "Along the valley of the Gila."

Distribution: In the vicinity of San Diego and adjacent Lower California, eastward to western Texas. Lower Sonoran.

Specimens examined: Chollas Valley, *Susan G. Stokes*, Aug. 25, 1895; Mission Valley, San Diego, *Brandege*, Aug. 1902; San Diego, *Orcutt*, Oct. 11, 1883.

2. GAERTNERIA.

Spines of the bur straight.

Leaves pinnately parted; spines glabrous or minutely pubescent.

1. *G. dumosa*.

Leaves sinuate-toothed to sinuate-pinnatifid; spines villous.

2. *G. eriocentra*.

Spines of the bur uncinat.

Leaves petioled, crenately toothed.

3. *G. chenopodifolia*.

Leaves clasping, coarsely spinose-dentate.

4. *G. ilicifolia*.

1. GAERTNERIA DUMOSA (A. Gray) Kuntze, Rev. Gen. Pl. 1: 339. 1891.

Franseria dumosa A. Gray, in Frem. Second Rep. 316. 1845.

Type locality: "On the sandy uplands of the Mohave River, and very common in all that region of North California."

Distribution: A very common and characteristic shrub of the Mohave and Colorado Deserts, extending eastward to southern Utah, and southward into northern Mexico and Lower California. Lower Sonoran.

Specimens examined: Signal Mountain, Imperial County, *Abrams* 3179; Mohave Desert, *Brandege*; Palm Springs, *Parish* 4121.

2. GAERTNERIA ERIOCENTRA (A. Gray) Kuntze, Rev. Gen. Pl. 1: 339. 1891.

Franseria eriocentra A. Gray, Proc. Am. Acad. 7: 355. 1868.

Type locality: "East slope of Providence Mountain, Arizona."

Distribution: From the Providence Mountains, eastward through southern Nevada and adjacent Arizona. Lower Sonoran.

Specimens examined: I have not seen any specimens from southern California.

3. *Gaertneria chenopodifolia* (Benth.)*Franseria chenopodifolia* Benth. Bot. Sulph. 26. 1844.

Type locality: "Bay of Magdalena."

Distribution: On the south slopes of hills at Tia Juana, and extending southward into Lower California. Lower Sonoran.

Specimens examined: Tia Juana, *Abrams* 3476.4. *GAERTNERIA ILICIFOLIA* (A. Gray) Kuntze, Rev. Gen. Pl. 1: 339. 1891.*Franseria ilicifolia* A. Gray, Proc. Am. Acad. 11: 77. 1876.

Type locality: "Great Canyon of the Tantillas Mountains, near the northern border of Lower California."

Distribution: Colorado Desert along the southern border of the State, extending southward on the desert slopes of Lower California. Lower Sonoran.

Specimens examined: Signal Mountain, *Abrams* 3184.

ASTERACEAE. ASTER FAMILY.

Anthers not caudate at base.

Receptacle naked.

Pappus of capillary-bristles, except *Gutierrezia*; involucrel bract not scarious-margined.

Involucrel bracts imbricated.

Involucrel bracts striate; style-branches thickened above, stigmatic only below the middle. 1. *Eupatorieae*.

Involucrel bracts not striate; style-branches with flattened terminal appendages, stigmatic to above the middle.

2. *Astereae*.Involucrel bracts in 1 or 2 series, not imbricated, except *Lepidospartum*; style-branches stigmatic to the summit.6. *Senecioneae*.

Pappus not of capillary-bristles; involucrel bracts imbricated, scarious-margined.

5. *Anthemideae*.

Receptacle with chaffy bracts.

4. *Heliantheae*.

Anthers caudate at base.

3. *Inuleae*.TRIBE 1. *Eupatorieae*.

Achenes 5-angled or 5-ribbed.

1. *Hofmeisteria*.

Achenes 10-nerved.

2. *Coleosanthus*.TRIBE 2. *Astereae*.

Rays present, yellow.

Pappus of several short scales; heads small; slender, suffrutescent plants.

3. *Gutierrezia*.

Pappus of capillary bristles.

Heads solitary, terminating naked peduncles. 5. *Stenotopsis*.

Heads not terminating naked peduncles, seldom solitary.

6. *Ericameria*.

Rays none.

Flowers perfect, yellow.

Pappus white or yellowish.

Pappus-bristles all slender.

Involucral bracts not in distinct vertical ranks; herbage resinous-punctate. 6. *Ericameria*.

Involucral bracts in distinct vertical ranks; only the first two species resinous-punctate. 7. *Chrysothamnus*.

Pappus-bristles, at least some, with flattened tips.

4. *Acampitopappus*.

Pappus tawny; bracts well-imbricated, squamose.

8. *Hazardia*.

Flowers dioecious, whitish.

9. *Baccharis*.

TRIBE 3. *Inuleae*.

Willow-like shrub, with silvery appressed pubescence. 10. *Pluchea*.

TRIBE 4. *Heliantheae*.

Pappus of plumose-bristles, rays none.

11. *Bebbia*.

Pappus of scales; rays present or none.

Disk-achenes thick, 4- or 5-angled, not winged.

12. *Viguiera*.

Disk-achenes flattened, the acute angles ciliate or winged.

13. *Encelia*.

TRIBE 5. *Anthemideae*.

Spinescent undershrub; achenes and flowers cobwebby.

14. *Picrothamnus*.

Not spinescent; achenes and flowers not cobwebby.

15. *Artemisia*.

TRIBE 6. *Senecioneae*.

Involucral bracts in 3 or 4 series, imbricated; leaves scale-like.

16. *Lepidospartum*.

Involucral bracts in 1 or 2 series.

Bracts of the involucre many, linear to subulate.

Heads discoid.

17. *Peucephyllum*.

Heads radiate.

19. *Senecio*.

Bracts of the involucre 4-6, broad and obtuse.

18. *Tetradymia*.

I. HOFMEISTERIA.

- I. HOFMEISTERIA PLURISETA A. Gray, Pacif. R. Rep. 4: 96,
pl. 9. 1857.

Type locality: "In a canyon at Bill William's fork, northern Arizona."

Distribution: Rocky places through the Mohave and the Colorado Deserts of southern California, eastward to Arizona and southern Utah. Lower Sonoran.

Specimens examined: Palm Springs, *Parish 4122*; Camp Cady, *Hall 6130*.

2. COLEOSANTHUS.

Heads campanulate, terminating corymbose branchlets.

Leaves ovate, rounded or cordate at base.

Herbage scabrous-atomiferous, green.

1. *C. atractyloides*.

Herbage white-tomentose.

2. *C. incanus*.

Leaves linear to oblong or obovate, narrowed at base.

Inner involuclral bracts acuminate; leaves 15-30 mm. long.

3. *C. linifolius*.

Inner involuclral bracts merely acutish; leaves 5-15 mm. long.

4. *C. frutescens*.

Heads turbinate, paniculate or glomerate.

Herbage white-tomentose; involuclral bracts acute.

5. *C. Nevinii*.

Herbage greenish (except 7); involuclral bracts acute.

Leaves ovate; heads 10-15-flowered.

Involucre 10-12 mm. high.

6. *C. californicus*.

Involucre 7-8 mm. high.

7. *C. desertorum*.

Leaves lanceolate; heads 5-flowered.

8. *C. Knappianus*.

1. COLEOSANTHUS ATRACTYLOIDES (A. Gray) Kuntze, Rev.

Gen. Pl. 1: 328. 1891.

Brickellia atractyloides A. Gray, Proc. Am. Acad. 8: 290. 1870.

Type locality: "Utah, near the Rio Colorado."

Distribution: The Mohave and Colorado Deserts of southern California, eastward to Arizona and southern Nevada. Lower Sonoran.

Specimens examined: Near Palm Springs, *S. B. & W. F. Parish 1210*; northern base of the San Bernardino Mountains, *Parish 3710*; Cushenberry Spring, *Parish 2387*; Colorado Desert, *Brandegee*, 1901; no locality, *Parry & Lemmon 158*; Rabbit Springs, *Parish 4875*; Providence Mountains, *Brandegee*, May 27, 1902.

[2. COLEOSANTHUS INCANUS (A. Gray) Kuntze, Rev.

Gen. Pl. 1: 328. 1891.

Brickellia incana A. Gray, Proc. Am. Acad. 7: 350. 1868.

Type locality: "Providence Mountain, in the Mohave district."

Distribution: In dry washes of the Mohave Desert, eastward to southern Nevada. Lower Sonoran.

Specimens examined: Providence Mountains, *Cooper*, 1860-61; dry washes near Mohave River, *S. B. & W. F. Parish* 1248; Cushenberry Springs, *Parish* 2388.

3. *COLEOSANTHUS LINIFOLIUS* (Eaton) Kuntze, Rev.

Gen. Pl. 1: 328. 1891.

Brickellia linifolia Eaton, Bot. King. Exp. 137, pl. 15, fig. 1-6. 1871.

Brickellia mohavensis A. Gray, Syn. Fl. 1, pt. 2: 104. 1884.

Type locality: "Sandy bottoms of American Fork, Jordan Valley, Utah."

Distribution: Gravelly places in the Mohave and Colorado Deserts, eastward to Arizona and Colorado. Lower Sonoran.

Specimens examined: Cactus Flat, Cushenberry Canyon, north slope of the San Bernardino Mountains, *Parish* 3111; eastern base of San Jacinto Mountain, *Hall* 2142; Providence Mountains, *Brandege*, May 26, 1902.

4. *COLEOSANTHUS FRUTESCENS* (A. Gray) Kuntze, Rev. Gen.

Pl. 1: 328. 1891.

Brickellia frutescens A. Gray, Proc. Am. Acad. 17: 207. 1882.

Type locality: "Mountain Springs, San Diego Co."

Distribution: Dry gravelly ridges on the desert slope of the Cuamaca Mountains, southward into adjacent Lower California. Lower Sonoran.

Specimens examined: Jacumba Hot Spring, *Abrams* 3665.

5. *COLEOSANTHUS NEVINII* (A. Gray) Heller, Cat. N. Am.

Pl. 8. 1898.

Brickellia Nevinii A. Gray, Proc. Am. Acad. 20: 297. 1884.

Type locality: "Los Angeles Co., California, near Newhall."

Distribution: Mountains of Ventura County, southward to the southern slopes of the San Gabriel Mountains. Upper Sonoran.

Specimens examined: Hot Springs Canyon, Ventura County, *Abrams & McGregor* 192; San Antonio Canyon, *Baker* 3731; near Sherman, *Braunton* 17; *Greata* 331.

6. *COLEOSANTHUS CALIFORNICUS* (Torr. & Gray) Kuntze,

Rev. Gen. Pl. 1: 328. 1891.

Bulbostylis californica Torr. & Gray, Fl. N. Am. 2: 79. 1840.

Brickellia californica (Torr. & Gray) A. Gray, Pl. Fendl. 64. 1849.

Type locality: "California." First collected by Douglas.

Distribution: Mendocino County and the foothills of the Sierra Nevada, southward to northern Lower California. In southern California this species is common on the coastal slope, growing in washes and on dry ridges in the chaparral. Upper Sonoran.

Specimens examined: Santa Barbara, *Elmer* 4189; Arroyo Seco, near Pasadena, *Grinnell*, Nov. 14, 1903; Elysian Park, Los Angeles, *Abrams* 4173; San Antonio Canyon, San Gabriel Mountains, *Baker* 3696; foothills of the San Bernardino Mountains, *S. B. & W. F. Parish* 566; San Diego, *Cleveland*, 1874; Santiago Canyon, Santa Ana Mountains, *Helen D. Geis* 523; Campo, *Palmer* 171.

7. *COLEOSANTHUS DESETORUM* Coville, Cont. Nat. Herb. 4: 119. 1893.

Brickellia desetorum Coville, Proc. Biol. Soc. Wash. 7: 68. 1892.

Brickellia californica desetorum (Coville) Hall, Univ. Calif. Pub. Bot. 3: 33. 1907.

Type locality: "Between Banning and Seven Palms, on the Southern Pacific Railroad, California."

Distribution: Growing in canyons on the desert slopes along the Colorado and Mohave deserts. Lower Sonoran.

Specimens examined: Dos Cabezas, *Orcutt*, Nov. 1, 1890.

8. *COLEOSANTHUS KNAPPIANUS* (Drew) Greene, Erythea 1: 54. 1893.

Brickellia Knappiana Drew, Pittonia 1: 260. 1888.

Type locality: "In the neighborhood of the Mohave River."

Distribution: In the more eastern and northern part of the Mohave Desert, perhaps not within our range. Lower Sonoran.

Specimens examined: Pleasant Canyon, Panamint Mountains, *Hall & Chandler* 6919.

3. *GUTIERREZIA*.

Flowers of ray and disk 1-2 each.

1. *G. lucida*.

Flowers of ray and disk several each.

Ultimate branchlets ascending, destitute of bract-like leaves.

2. *G. divergens*.

Ultimate branchlets strictly divaricate, clothed with very short bract-like leaves.

3. *G. bracteata*.

These species are scarcely more than suffrutescent, and probably could be excluded with equal propriety.

1. GUTIERREZIA LUCIDA Greene, Fl. Franc. 361. 1897.

Xanthocephalum lucidum Greene, Pittonia 2: 282. 1892.

Type locality: "In the region of the Mohave Desert, and southward."

Distribution: Dry gravelly hillsides in the Mohave Desert. Lower Sonoran.

Specimens examined: Between Mohave and Rosemond, *Abrams* & *McGregor* 506.

2. GUTIERREZIA DIVERGENS Greene, Pittonia 4: 58. 1899.

Type locality: "San Bernardino mesas."

Distribution: Dry mesas and foothills in the coastal region of southern California. Upper and Lower Sonoran.

Specimens examined: Los Angeles, *Nevin*, 1879; *Brandegee*; San Gabriel Canyon, *Abrams* 2720; Los Angeles, *Gambel*; Tia Juana, *Herre*, Aug. 8, 1902; vicinity of San Bernardino, *Parish* 5151; El Toro, *Abrams* 1858; Santiago Canyon, Santa Ana Mountains, *Helen D. Geis* 573; Alpine, San Diego County, *Mearns* 3997.

3. GUTIERREZIA BRACTEATA Abrams, Bull. Torrey Club 34: 265. 1907.

Gutierrezia californica bracteata Hall, Univ. Calif. Pub. Bot. 3: 36. 1907.

Gutierrezia laricina Greene, Rep. Nov. Spec. 7: 195. 1909.

Type locality: "Desert slopes of San Bernardino County, between Banning and Seven Palms."

Distribution: Dry sandy soil on the western border of the Colorado Desert. Lower Sonoran.

Specimens examined: Between Banning and Seven Palms, *Orcutt*, Nov. 1889.

4. ACAMTOPAPPUS.

1. ACAMTOPAPPUS SPHAEROCEPHALUS Harv. & Gray; A. Gray, Pl. Fendl. 76. 1849.

Type locality: "California." First collected by Coulter.

Distribution: In the covillea belt of the Colorado and Mohave Deserts, eastward to Arizona and southern Utah. Lower Sonoran.

Specimens examined: Mohave Desert, *Pringle*, May 24, 1882; San Felipe, *Antisell*; Lancaster, *Elmer* 3621; eastern base of San Jacinto Mountain, *Hall* 2108; Barstow Hills, *Hall* 6159; Palmdale, *Abrams & McGregor* 513; Willow Springs, *Abrams & McGregor* 423.

5. STENOTOPSIS.

Leaves thin, mostly 4-5 cm. long; involucral bracts over 1 cm. long; achenes 5 mm. long. 1. *S. linearifolius*.

Leaves coriaceous, glutinous, less than 2 mm. long; involucral bracts less than 1 cm. long; achenes 3.5 mm. long. 2. *S. interior*.

1. STENOTOPSIS LINEARIFOLIUS (DC.) Rydb. Bull. Torrey Club 27: 617. 1900.

Aplopappus linearifolius DC. Prod. 5: 347. 1836.

Stenotus linearifolius Torr. & Gray, Fl. N. Am. 2: 238. 1842.

Type locality: "In California."

Distribution: Foothills of the Coast Ranges from Sonoma County, southward to northern Lower California, and also on the western slope of the Sierra Nevada (Marysville Buttes, *Heller* 5558). Upper Sonoran.

Specimens examined: Cajon Pass, *Orcutt*, 1883; vicinity of San Bernardino, *Wright*, 1881; Coahuilla Hills, Riverside County, altitude 900 meters, *Hall* 2902; Potrero, *Abrams* 3549.

2. STENOTOPSIS INTERIOR (Coville) Rydb. Bull. Torrey Club 27: 617. 1900.

Aplopappus interior Coville, Proc. Biol. Soc. Wash. 7: 65. 1892.

Stenotus interior Greene, Erythea 2: 72. 1894.

Stenotus linearifolius interior Hall, Univ. Calif. Pub. Bot. 3: 48. 1907.

Type locality: "About 4 miles southeast from Mill Canyon Divide, at the northern edge of the Darwin Mesa, Inyo County, California."

Distribution: On the western borders of the Mohave and Colorado Deserts, eastward to Arizona and southern Utah. Lower Sonoran.

Specimens examined: Mountains Springs, *Vasey* 260; Jacumba Hot Spring, *Abrams* 3647; Mount Pinos, *Elmer* 3993; near Cuddy's ranch, Ventura County, *Dudley* 4506; Seymons Creek, Mount Pinos,

Hall 6498; Soldiers' Camp near Fort Tejon, *Abrams & McGregor* 276.

6. ERICAMERIA.

Leaves glabrous, glandular-punctate; style-appendages filiform-subulate.

Leaves not filiform.

Leaves obovate or oblanceolate; low, spreading shrub; branches 1-2 dm. long. 1. *E. cuneata spathulata*.

Leaves flat, linear-lanceolate; erect shrub, 1-3 m. high.

2. *E. Parishii*.

Leaves filiform.

Rays wanting.

Inflorescence cymose.

3. *E. arborescens*.

Inflorescence paniculate.

4. *E. brachylepis*.

Rays present.

Achenes pubescent.

Outer involucre bracts obtuse. 5. *E. Palmeri*.

Outer involucre bracts acuminate.

6. *E. pinifolia*.

Achenes glabrous; outer involucre bracts acute.

7. *E. ericoides*.

Leaves minutely pubescent, often obscurely glandular-punctate; style-appendages oblong-ovate.

8. *E. monactis*.

1. ERICAMERIA CUNEATA SPATHULATA (A. Gray) Hall, Univ. Calif. Pub. Bot. 3: 52. 1907.

Bigelovia spathulata A. Gray, Proc. Am. Acad. 11: 74. 1876.

Bigelovia rupestris Greene, Bot. Gaz. 6: 183. 1881.

Chrysoma cuneata spathulata Greene, Erythea 3: 11. 1895.

Chrysoma Merriami Eastw. Bull. Torrey. Club 32: 214. 1905.

Type locality: "Near the entrance of the Tantillas Great Canyon, in Lower California, near the borders of the State."

Distribution: On rocky ledges from the San Gabriel Mountains southward into northern Lower California. Upper Sonoran.

Specimens examined: Cucamongo Mountains, *S. B. & W. F. Parish* 1027; San Gabriel Canyon, *Abrams* 853; Hines Peak, Topatopa Mountains, *Abrams & McGregor* 85. (Closely resembling the typical form, but not in bloom, and therefore placed here doubtfully.)

2. ERICAMERIA PARISHII (Greene) Hall, Univ. Calif. Pub. Bot. 3: 55. 1907.

Bigelovia Parishii Greene, Bull. Torrey Club 9: 62. 1882.

Chrysoma Parishii Greene, Erythea 3: 10. 1895.

Aster Parishii Kuntze, Rev. Gen. Pl. 1: 318. 1891.

Type locality: "San Bernardino Mountains, California."

Distribution: Western slope of the San Gabriel Mountains, southward to northern Lower California. Upper Sonoran.

Specimens examined: San Bernardino Mountains, 450-750 meters altitude, S. B. & W. F. Parish 571; canyons of the San Bernardino Mountains, Parish, Sept., 1900; San Gabriel Canyon, altitude 750 meters, Abrams 850; Waterman Canyon, Parish 4584; Lytle Creek, altitude 650 meters, Abrams 1961; San Felipe, Susan G. Stokes, July, 1895; Cuernavaca Mountains, altitude 1200 meters, Susan G. Stokes, June 20, 1895.

3. *ERICAMERIA ARBORESCENS* (A. Gray) Greene, Man. Bay
Reg. 175. 1894.

Linosyris arborescens A. Gray, Bot. Mex. Bound. 79. 1859.

Chrysoma arborescens Greene, Erythea 3: 10. 1895.

Bigelovia arborescens A. Gray, Proc. Am. Acad. 8: 638. 1873.

Type locality: "California."

Distribution: In the Coast Ranges and Sierra Nevada of central California, extending southward to the Santa Ynez Mountains. Upper Sonoran.

Specimens examined: La Cumbre Peak, Santa Ynez Mountains, Abrams 4317.

4. *ERICAMERIA BRACHYLEPIS* (A. Gray) Hall, Univ. Calif. Pub.
Bot. 3: 56. 1907.

Bigelovia brachylepis A. Gray, Bot. Calif. 1: 614. 1876.

Chrysoma brachylepis Greene, Erythea 3: 12. 1895.

Type locality: "Larken's Station, 80 miles east by north of San Diego."

Distribution: Along the southern border of San Diego County, and extending southward into adjacent Lower California. Lower and Upper Sonoran.

Specimens examined: Larken's Station, Palmer, 1875 (type); Potrero, Cleveland, 1876.

5. *ERICAMERIA PALMERI* (A. Gray) Hall, Univ. Calif. Pub.
Bot. 3: 53. 1907.

Aplopappus Palmeri A. Gray, Proc. Am. Acad. 11: 74. 1876.

Chrysoma Palmeri Greene, Erythea 3: 12. 1895.

Aster Nevinii Kuntze, Rev. Gen. Pl. 1: 316. 1891.

Type locality: "Tecate Mountains, Lower California, twenty or thirty miles below the state boundary."

Distribution: On dry sandy plains and foothills of the coastal slope of southern California, extending southward into northern Lower California. Upper and Lower Sonoran.

Specimens examined: San Gorgonio Pass, *Parry*; mesas about San Bernardino, *S. B. & W. F. Parish 654*; *Parish 5127*; Inglewood, *Abrams 4201*.

6. *ERICAMERIA PINIFOLIA* (A. Gray) Hall, Univ. Calif. Pub. Bot. 3: 54. 1907.

Aplopappus pinifolius A. Gray, Proc. Am. Acad. 8: 636. 1873.

Chrysoma pinifolia Greene, Erythea 3: 12. 1895.

Aster pityphyllus Kuntze, Rev. Gen. Pl. 1: 316. 1891.

Type locality: "Near Los Angeles, in dry river-beds."

Distribution: On the dry plains and foothills from the vicinity of Los Angeles, southward to the southern boundary of the State. Upper and Lower Sonoran.

Specimens examined: Los Angeles, *Bolander*, 1873 (type); *Nevin*, 1879; vicinity of San Bernardino, *Parish 4202*; *Wright*, 1880; Lytle Creek Canyon, *Abrams 2744*; vicinity of San Bernardino, *Parish 5130* (in part—the leafless branch is *Lepidospartum squamatum*); Big Tejuanga wash, *Abrams 1372*; Potrero, *Susan G. Stokes*, July 14, 1895; Cajon Pass, *Abrams & McGregor 696*; near Julian, *Orcutt*, Oct., 1889; Soledad Pass, *Pringle*, Oct. 21, 1882.

7. *ERICAMERIA ERICOIDES* (Less.) Jepson, Fl. W. Mid. Calif. 559. 1901.

Diplopappus ericoides Less. Linnaea 6: 117. 1831.

Aplopappus ericoides Hook. & Arn. Bot. Beech. 146. 1833.

Ericameria microphylla Nutt. Trans. Am. Phil. Soc. II. 7: 329. 1840.

Chrysoma ericoides Greene, Erythea 3: 11. 1895.

Aster ericinus Kuntze, Rev. Gen. Pl. 1: 313. 1891.

Type locality: "Cel. de Chamisso in California," probably at San Francisco.

Distribution: Sand-dunes along the coast from central California south to Los Angeles County. Upper Sonoran.

Specimens examined: Playa del Rey, *Abrams 199*.

8. *ERICAMERIA MONACTIS* (A. Gray) McClatchie, *Erythraea* 2: 124. 1894.

Aplopappus monactis A. Gray, *Proc. Am. Acad.* 19: 1. 1883.

Acamptopappus microcephalus Jones, *Contr. W. Bot.* no. 8: 33. 1898.

Tumionella monactis Greene, *Leaflets* 1: 173. 1906.

Chrysothamnus corymbosus Elmer, *Bot. Gaz.* 39: 50. 1905.

Type locality: "Borders of the Mohave Desert, S. E. California."

Distribution: Mohave Desert from Owens Valley south to Cajon Pass. This species has also been reported as occurring on the coastal slope in the vicinity of West Riverside. Lower Sonoran.

Specimens examined: Mohave River, *Palmer* 199 (type); head of Cajon Pass, *S. B. & W. F. Parish* 905; north slopes of San Bernardino Mountains, *S. B. & W. F. Parish* 1246; Mohave Desert, *Pringle*, May, 1882; Lancaster, *Elmer* 3668; near Sprague's Ranch, Liebre Mountains, *Dudley* 4370; near Barstow, *Hall* 6169; Willow Springs, Antelope Valley, *Abrams & McGregor* 419.

7. CHRYSOTHAMNUS.

Leaves resinous-punctate, terete.

Outer involucrel-bract with a distinct greenish subapical spot.

1. *C. teretifolius*.

Outer involucrel bracts pale, without greenish spot.

2. *C. paniculatus*.

Leaves not resinous-punctate, plane or canaliculate.

Branches not tomentose; leaves glabrous except on the margins.

Stems glutinous; leaves not ciliate, often sparse.

3. *C. mohavensis*.

Stems not glutinous, leafy; leaves short-ciliate on the margins.

4. *C. stenophyllus*.

Branches more or less tomentose.

Heads 5-flowered.

Bracts abruptly contracted to a spreading setiform tip.

5. *C. ceruminosus*.

Bracts acute or acuminate.

6. *C. occidentalis*.

Heads 9-flowered; a few of the outer bracts foliaceous.

7. *C. Parryi*.

1. *CHRYSOTHAMNUS TERETIFOLIUS* (Dur. & Hilg.) Hall, *Univ. Calif. Pub. Bot.* 3: 57. 1907.

Linosyris teretifolia Dur. & Hilg. *Pacif. R. Rep.* 5: 9, *pl.* 7. 1855.

Bigelovia teretifolia A. Gray, *Proc. Am. Acad.* 8: 644. 1873.

Chrysoma teretifolia Greene, Erythea 3: 12. 1895.

Type locality: "All over the mountains around Tejon Valley."

Distribution: On the desert slopes of the mountains of southern California from Tejon Pass southward to the Cuernavaca Mountains (according to Gray), and eastward to southern Nevada. Lower Sonoran.

Specimens examined: Mountains around Tejon Valley, *Heerman* (type); Morongo Pass, *Parry*; San Geronimo Pass, *S. B. & W. F. Parish* 655; hills bordering the Mohave Desert, *Pringle*, Oct. 21, 1882.

2. *CHRYSOTHAMNUS PANICULATUS* (A. Gray) Hall, Univ. Calif. Pub. Bot. 3: 58. 1907.

Linosyris viscidiflora paniculata A. Gray, Bot. Mex. Bound. 80. 1859.

Bigelovia paniculata A. Gray, Proc. Am. Acad. 8: 644. 1873.

Chrysoma paniculata Greene, Erythea 3: 12. 1895.

Type locality: "California, Schott, probably in the southeastern part of the State: the station not recorded."

Distribution: On the Mohave and the Colorado Deserts of southern California, and extending into Arizona and southern Nevada. Lower Sonoran.

Specimens examined: California, locality not given, *Schott* (type); desert mountains, station not given, *S. B. & W. F. Parish* 651; desert washes, *Parry*, 1875; Whitewater, *S. B. & W. F. Parish* 655; Larken's Station (Jacumba Hot Spring), *Palmer*, 1875.

3. *CHRYSOTHAMNUS MOHAVENSIS* Greene, Erythea 3: 113. 1895.

Bigelovia mohavensis Greene, A. Gray, Syn. Fl. 1, pt. 2: 138. 1884.

Aster mohavensis Kuntze, Rev. Gen. Pl. 1: 318. 1891.

Type locality: "On the Mohave Desert."

Distribution: Mohave Desert, from the Tehachapi Mountains southward to the desert slopes of the San Bernardino Mountains. Lower Sonoran.

Specimens examined: Tehachapi Pass, *Eastwood*, Sept. 1894; Mohave Desert, *Pringle*, Oct., 1882; Fort Tejon, *Rothrock* 271; San Bernardino Mountains, *S. B. & W. F. Parish* 1072; Cushenberry Springs, north slope of San Bernardino Mountains, *Abrams* 2145; Rock Creek, *Abrams & McGregor* 625.

4. **CHRYSOTHAMNUS STENOPHYLLUS** (A. Gray) Greene, *Erythea* **3**: 94. 1895.

Bigelovia Douglasii stenophylla A. Gray, Proc. Am. Acad. **8**: 646. 1873.

Chrysothamnus viscidiflorus stenophyllus Hall, Univ. Calif. Pub. Bot. **3**: 59. 1907.

Type locality: "Northwestern Nevada."

Distribution: Western Nevada and the eastern slope of the Sierra Nevada, southward to the San Bernardino Mountains. In the more arid parts of the Transition Zone.

Specimens examined: Bear Valley, San Bernardino Mountains, S. B. & W. F. Parish 1454; Abrams 2133, 2889.

5. **CHRYSOTHAMNUS CERUMINOSUS** (Dur. & Hilg.) Greene, *Erythea* **3**: 94. 1895.

Linosyris ceruminosa Dur. & Hilg. Pacif. R. Rep. **5**, pt. 3: 9, pl. 6. 1855.

Bigelovia ceruminosa A. Gray, Proc. Am. Acad. **8**: 643. 1873.

Type locality: "Tejon Pass."

Distribution: This species was collected by Dr. Heerman, of the Pacific Railway Survey, in the region of Tejon Pass, but has never been rediscovered.

6. **CHRYSOTHAMNUS OCCIDENTALIS** Greene, Fl. Fran. 369. 1897.

Chrysothamnus californicus occidentalis Greene, *Erythea* **3**: 112. 1895.

Chrysothamnus nauseosus occidentalis Hall, Univ. Calif. Pub. Bot. **3**: 60. 1907.

Type locality: "In the Coast Ranges from Humboldt County southward." Later (Fl. Fran.) Greene gives the range as "Kern and Santa Barbara counties."

Distribution: Mountains of Santa Barbara County and southern Kern County, southward to the San Jacinto Mountains. Transition.

Specimens examined: Green Valley, Shaw & Illingsworth 55.

7. **CHRYSOTHAMNUS PARRYI** (A. Gray) Greene, *Erythea* **3**: 113. 1895.

Linosyris Parryi A. Gray, Proc. Philad. Acad. **1863**: 63. 1863.

Bigelovia Parryi A. Gray, Proc. Am. Acad. **8**: 642. 1873.

Type locality: "Rocky Mountains of Colorado in the region of South and Middle Park," according to Gray (Proc. Am. Acad. 8: 642).

Distribution: A Rocky Mountain species of rather high altitudes which occurs on Alamo Mountain, altitude 2100 meters, eastern Ventura County, according to Hall (Univ. Calif. Pub. Bot. 3: 62. 1907).

8. HAZARDIA.

1. *HAZARDIA SQUARROSA* (Hook. & Arn.) Greene, *Erythea* 2: 112. 1894.

Aplopappus squarrosus Hook. & Arn. Bot. Beechey 146. 1833.

Type locality: Probably Monterey. "Collected at San Francisco, and a few at Monterey Bay" is the general locality given at the head of the list of plants in which this species appears.

Distribution: Monterey, southward to San Diego, and on the islands off the coast of southern California. Upper Sonoran.

Specimens examined: Mountain Drive, near Santa Barbara, *Eastwood* 201; *Abrams* 4147; Los Angeles, *Hasse*, Oct., 1887; Elysian Park, *Abrams* 4180; San Antonio Canyon, *Baker* 3732; San Diego, *Brandegge*, Sept. 13, 1902 (*Baker* 3426); San Ysabel, *Hayes* 395.

9. BACCHARIS.

Achenes 10-nerved; leaves not willow-like.

Pappus of fertile flowers conspicuously elongating in fruit, flaccid.

Leaves except some of the uppermost not linear.

Leaves obovate, sessile; pappus, in fruit, about 8 mm. long.

1. *B. pilularis*.

Leaves of branches oblanceolate or oblong, those of the branchlets linear; heads somewhat nakedly paniculate.

2. *B. Emoryi*.

Leaves all linear, rigid, those of the strongly striated branchlets sparse and minute; involucre of male flowers 3-4 mm. long.

3. *B. sarothroides*.

Pappus of fertile flowers rather rigid and scanty, not elongated in age; branches broom-like.

4. *B. sergiloides*.

Achenes 5-nerved or rarely 4-nerved.

Leaves willow-like, glabrous and sometimes glutinous.

Involucre 5-6 mm. long; bracts stramineous.

5. *B. glutinosa*.

Involucres 8 mm. long; bracts tawny.

6. *B. viminea*.

Leaves pubescent, linear-oblong, obtuse, acutely serrate.

7. *B. Plummerae*.

1. *BACCHARIS PILULARIS* DC. Prod. 5: 407. 1836.

Baccharis consanguinea DC. Prod. 5: 408. 1836.

Type locality: "In California." First collected by Douglas.

Distribution: Coastal region of Oregon, southward to Santa Monica, southern California. In southern California this species is local at Santa Monica, but is more frequent in the coastal region of Santa Barbara and Ventura Counties. Upper Sonoran.

Specimens examined: Santa Catalina Island, *Blanche Trask*, Sept., 1897; Santa Barbara, *Abrams*, Aug., 1909.

2. *BACCHARIS EMORYI* A. Gray, Bot. Mex. Bound. 83. 1859.

Type locality: "Very common on the Gila; *Emory*, coll. in 1846, etc. Fort Yuma, E. California; Major Thomas." *Emory's* specimen in the Gray Herbarium is a mere fragment, and the original description, at least of the pistillate plant was undoubtedly drawn from Thomas' plant.

Distribution: Western Arizona and southern Utah, westward to the coastal region of southern California. Upper and Lower Sonoran.

Specimens examined: Near Los Angeles, *Nevin*, 1880; San Bernardino Valley, *S. B. & W. F. Parish* 613; *Parish* 5163, and Nov., 1902; San Luis Rey, *Parry*, 1850; Potrero, *Cleveland*, 1876; Fallbrook, *Orcutt*, Nov., 1883; near Imperial, *G. D. Abrams*, Jan., 1902; near Santa Ana, *Helen D. Geis* 548.

3. *BACCHARIS SAROTHOIDES* A. Gray, Proc. Am. Acad. 17: 211. 1882.

Type locality: "Southern borders of California, San Diego Co., near the old Mission Station, the boundary monuments, etc."

Distribution: In the extreme southern part of the State and adjacent Lower California, eastward to Arizona. Lower Sonoran.

Specimens examined: Boundary monument, near San Diego, *Palmer* 265; Mission Valley, *Orcutt*, Oct., 1883; near San Diego *Hayes*, Oct. 14, 1858; San Felipe Canyon, *Palmer*, 1875; Chula, Vista, *Abrams* 4192; Jacumba Hot Spring, *Abrams* 3670.

4. *BACCHARIS SERGILOIDES* A. Gray, Torr. Bot. Mex. Bound. 83. 1859.

Type locality: "Along the Gila or Colorado, dry arroyos, 50

miles west of the Colorado," also in the "southern part of California."

Distribution: From the western part of the Colorado and the Mohave Deserts, eastward to southern Utah. Lower Sonoran.

Specimens examined: Palm Springs, *S. B. & W. F. Parish* 296.

5. *BACCHARIS GLUTINOSA* Pers. Syn. 2: 425. 1807.

Type locality: "An R[egni] Chilensis ruderatis."

Distribution: Along watercourses in the Colorado Desert, extending eastward to Arizona and southern Colorado, and southward into Mexico and Chili. This species has been reported from the coastal region near Los Angeles, but perhaps erroneously. Lower Sonoran.

Specimens examined: Imperial Valley, near Calexico, *Abrams* 4004, 4093.

6. *BACCHARIS VIMINEA* DC. Prod. 5: 400. 1836.

Type locality: "In California." First collected by Douglas.

Distribution: Common along watercourses and in moist places in southern California on the coastal slope; extending from the Sacramento Valley southward to northern Lower California. Upper and Lower Sonoran.

Specimens examined: Los Angeles, *Brewer* 171; *Grant* 97; San Bernardino Valley, *S. B. & W. F. Parish* 702; Sweetwater Valley, *Deane*, April 8, 1888; San Diego River, *Abrams* 3380; Acton, *Elmer* 3701; vicinity of San Bernardino, *Parish* 5014; Big Tejunga wash, San Fernando Valley, *Abrams* 1393; Tia Juana River, *Herre*, Aug. 8, 1902; Monrovia, *Dudley*, Nov. 25, 1907; Los Angeles, *Grant* 97; Rock Creek, San Gabriel Mountains, *Abrams* & *McGregor* 557.

7. *BACCHARIS PLUMMERAE* A. Gray, Proc. Am. Acad. 15: 48. 1880.

Type locality: "Along a stream in Glen Loch ravine, in the mountains near Sta. Barbara, California."

Distribution: Santa Ynez Mountains northward to Santa Monica. Originally described as herbaceous, but distinctly woody, forming rounded bushes, about 1 meter high. Upper Sonoran.

Specimens examined: La Cumbre trail, Santa Ynez Mountains, *Abrams* 4307.

10. PLUCHEA.

I. *PLUCHEA SERICEA* (Nutt.) Coville, Cont. Nat. Herb. 4: 128. 1893.

Polypappus sericeus Nutt. Journ. Acad. Philad. II. 1: 178. 1847.

Tessaria borealis DC.; Torr. & Gray in Emory, Notes Mil. Reconnois. 143. 1848, without description.

Tessaria borealis A. Gray, Pl. Wright. 1: 102. 1852.

Pluchea borealis A. Gray, Proc. Am. Acad. 17: 212. 1882.

Type locality: "Rocky Mountains of Upper California."

Distribution: Along watercourses, extending from Santa Barbara County southward into Lower California, and eastward through the Mohave and Colorado Deserts to the Rio Grande. This species, which is commonly called "arrow-weed," is very common along ditches in the Imperial Valley. Lower Sonoran.

Specimens examined: Santa Clara Valley, Ventura County, *Rothrock* 184; San Diego, *Palmer*, 1875; Mohave Desert, *Brandegee*; Calexico, *Abrams* 4096; Tia Juana River, *Abrams* 3515; San Miguel Mountain, *Chandler* 5195.

11. BEBBIA.

Herbage green and glabrous.

1. *B. juncea*.

Herbage scabrous.

1a. *B. juncea aspera*.

I. *BEBBIA JUNCEA* (Benth.) Greene, Bull. Calif. Acad. 1: 180. 1885.

Carphephorus junceus Benth. Bot. Sulph. 21. 1844.

Type locality: "Bay of Magdalena," Lower California.

Distribution: Western base of the San Bernardino Mountains, southward in the coastal region to northern Lower California. Lower Sonoran.

Specimens examined: City Creek wash, near Highlands, *Abrams* 2803; Santiago Canyon, Santa Ana Mountains, *Helen D. Geis*, Dec., 1902; between Grantville and Santee, *Abrams* 3755; Canyon of the San Jacinto River, *Hall* 2016; Santa Ana Canyon, San Bernardino Mountains, *Shaw & Illingsworth*, Aug. 10, 1901.

12. *BEBBIA JUNCEA ASPERA* Greene, Bull. Calif. Acad. 1: 180. 1885.

Bebbia aspera Nelson, Bot. Gaz. 37: 273. 1904.

Type locality: "Southeastern borders of California and adjacent Arizona."

Distribution: Common in sandy washes in the Colorado Desert, extending northward through the Mohave Desert, and eastward to southern Nevada and Arizona. Specimens have also been found on the coastal slope in southern California. Lower Sonoran.

Specimens examined: "San Diego," *Brandegee*; Signal Mountain, *Abrams 3161*.

12. VIGUIERA.

Leaves lanceolate; achenes sparsely pubescent.

1. *V. laciniata*.

Leaves ovate; achenes densely villous.

2. *V. Parishii*.

1. *VIGUIERA LACINIATA* A. Gray, Bot. Mex. Bound. 89. 1859.

Type locality: "Rancho Gamacho, east of San Diego, California."

Distribution: A common shrub on the mesas and foothills in the southwestern part of San Diego County, extending into adjacent Lower California. Lower Sonoran.

Specimens examined: Rancho Gamacho, east of San Diego, *Schott*, Sept., 1855 (type); near San Diego, *Newberry*; Sweetwater, *Cleveland*, April, 1876; Cottonwood Grade, near Potrero, *Abrams 3901*; San Diego, *Susan G. Stokes*, June 20, 1895; Mission Hills, San Diego, *Abrams 3450*.

2. *VIGUIERA PARISHII* Greene, Bull. Torrey Club 9: 15. 1882.

Viguiera deltoidea Parishii Rose, Cont. Nat. Herb. 1: 72. 1890.

Type locality: "San Luis Rey."

Distribution: Western San Diego County, where it is rare, eastward to the Providence Mountains. Upper and Lower Sonoran.

Specimens examined: San Luis Rey, *S. B. & W. F. Parish 963* (type); Palm Springs, *Parish 4126*.

13. ENCELIA.

Peduncles pubescent.

Rays present.

Involucre densely villous; disk purple.

1. *E. californica*.

Involucre canescent; disk yellow.
 Rays none; herbage scabrous.
 Peduncles glabrous; leaves silvery tomentose.

2. *E. actoni*.
3. *E. frutescens*.
4. *E. farinosa*.

1. *ENCELIA CALIFORNICA* Nutt. Trans. Am. Phil. Soc. 7: 357.
 1841.

Type locality: "On dry hills, near St. Barbara, Upper California."

Distribution: Common on hillsides from Santa Barbara southward on the coast slope to northern Lower California. Confined mainly to the Upper Sonoran but extending into the Lower Sonoran toward its southern limits.

Specimens examined: Santa Barbara, *Bolander*, 1873; hills near Inglewood, *Abrams* 3107; Santa Monica Canyon, *Abrams* 1486; San Diego, *Susan G. Stokes*, June 12, 1895; Santiago Canyon, Santa Ana Mountains, *Helen D. Geis* 540; Santa Barbara, *Elmer* 3899; hillsides at Tia Juana, *Abrams* 3479.

2. *ENCELIA ACTONI* Elmer, Bot. Gaz. 39: 47. 1905.

Encelia frutescens f. *actoni* Hall, Univ. Calif. Pub. Bot. 3: 135.
 1907.

Type locality: "Acton, Los Angeles county, California."

Distribution: Western slopes of the Mohave and Colorado Deserts, extending into the coastal region in the vicinity of San Jacinto. Lower Sonoran.

Specimens examined: Acton, *Elmer* 3724 (type); Hesperia, *Parish* 4873; San Felipe, *Susan G. Stokes*, July 28, 1895; Ventura, *Brandeggee*; Jacumba Hot Spring, *Abrams* 3667; San Jacinto, *Hall* 2907; Liebre Mountains, *Abrams & McGregor* 402; between Tehachapi and Mohave, *Abrams & McGregor* 500; Rock Creek, *Abrams & McGregor* 548.

3. *ENCELIA FRUTESCENS* A. Gray, Proc. Am. Acad. 8: 657. 1873.

Simsia frutescens A. Gray, Bot. Mex. Bound. 89. 1859.

Encelia frutescens f. *ovata* Hall, Univ. Calif. Pub. Bot. 3: 135.
 1907.

Type locality: "Sierra Prieta, near Fort Yuma, E. California."

Distribution: Dry hillsides and washes of the Colorado and Mohave Deserts, eastward to Arizona and southern Nevada. Lower Sonoran.

Specimens examined: Signal Mountain, *Abrams* 3156, and Dec. 29, 1907; McCoy wash, Colorado Desert, *Hall* 5939.

4. *ENCELIA FARINOSA* A. Gray; Torr. in Emory, Notes Mil. Reconnois. 143. 1848.

Type locality: According to Emory's notes (page 103) this species was collected in southern California in the vicinity of Carriso Creek.

Distribution: San Bernardino Valley, southward to northern Lower California and eastward to Arizona. Lower Sonoran.

Specimens examined: Vicinity of San Bernardino, *Parish* 4782; Signal Mountain, *Abrams* 3159; near Mentone, *Abrams* & *McGregor* 823.

14. *PICROTHAMNUS*.

1. *PICROTHAMNUS DESETORUM* Nutt. Trans. Am. Phil. Soc. II. 7: 417. 1841.

Artemisia spinescens Eaton, Bot. King. Exped. 180, pl. 19. 1871.

Type locality: "North sources of the Platte."

Distribution: Mohave Desert of southern California extending northward throughout the Great Basin region. Upper Sonoran.

Specimens examined: I have not seen any specimens within our range.

15. *ARTEMISIA*. SAGE-BRUSH.

Heads heterogamous; marginal flowers pistillate, the central perfect; leaf-segments filiform. 1. *A. californica*.

Heads homogamous; the flowers all perfect; leaf-segments not filiform.

Achenes glabrous.

Involucre oblong, 3-8, or rarely 9-flowered.

Accessory bracts of the involucre short and ovate.

2. *A. tridentata*.

Accessory bracts of the involucre oblong or lanceolate.

3. *A. tripartita*.

Involucre short-campanulate, 9-12-flowered; bracts all ovate or oval, glabrate.

4. *A. Rothrockii*.

Achenes pubescent.

5. *A. Parishii*.

1. *ARTEMISIA CALIFORNICA* Less. Linnaea 6: 523. 1831.

Artemisia abrotanoides Nutt. Trans. Am. Phil. Soc. II. 7: 399. 1841.

Artemisia foliosa Nutt. Trans. Am. Phil. Soc. II. 7: 397. 1841.

Type locality: "De Chamisso in California."

Distribution: San Francisco Bay, southward through the Coast Ranges to Lower California. Upper Sonoran.

Specimens examined: Sierra Santa Monica, *Brewer* 53; sandy plains near Colton, *Pringle*, Oct. 22, 1882; San Luis Rey, *Parry*; Santa Barbara, *Elmer* 3964; near Oneonta, *Herre*, Aug. 8, 1902.

2. *ARTEMISIA TRIDENTATA* Nutt. Trans. Am. Phil. Soc. II. 7: 398. 1841.

Type locality: "Hab. Plains of the Oregon, and Lewis River."

Distribution: Eastern Washington, eastward throughout the arid regions of the Rocky Mountains, and southward to Lower California. In southern California it is common on the desert slopes of the mountains in, and just below, the yellow pine belt. Arid Transition and Upper Sonoran.

Specimens examined: Holcomb Valley, San Bernardino Mountains, *Shaw & Illingsworth* 211.

3. *ARTEMISIA TRIPARTITA* Rydb. Mem. N. Y. Bot. Gard. 1: 432. 1900.

Artemisia trifida Nutt. Trans. Am. Phil. Soc. II. 7: 398. 1841.

Not Turcz. 1832.

Type locality: "Placers of the Rocky Mountains and Oregon."

Distribution: Mohave Desert, extending eastward and northward through the Great Basin region. Upper and Lower Sonoran.

Specimens examined: I have not seen any specimens from southern California.

4. *ARTEMISIA ROTHROCKII* A. Gray, Bot. Calif. 1: 618. 1876.

Type locality: "Sierras of Tulare Co., Olanche Mountains and Monachay Meadows, at 8,000 to 9,300 feet."

Distribution: Southern Sierra Nevada, south to the San Bernardino Mountains, and east to southern Utah. Arid Transition and Upper Sonoran.

Specimens examined: I have not seen any specimens from southern California.

5. *ARTEMISIA PARISHII* A. Gray, Proc. Am. Acad. 17: 220. 1882.

Type locality: "Newhall, Los Angeles Co., and in Cajon Pass, California." According to Parish (Zoe 5: 120), "the second station 'Cajon Pass' given in the original description is an error. The plant has been found, as yet, only at Newhall."

Distribution: A common plant in the vicinity of Newhall and in Antelope Valley often forming large shrubs 2 meters high or more. Much of this material has been mistaken heretofore for *Artemisia tridentata angustifolia* A. Gray, with which it is closely related if not identical.

Specimens examined: Newhall, S. B. & W. F. Parish 1065; Helen D. Geis; near Lancaster, Wells, Dec., 1909; near Burbank, Braunton 907.

16. LEPIDOSPARTUM.

1. *LEPIDOSPARTUM SQUAMATUM* A. Gray, Proc. Am. Acad. 19: 50. 1883.

Linosyris squamata A. Gray, Proc. Am. Acad. 8: 290. 1870.

Linosyris squamata Breweri A. Gray, Proc. Am. Acad. 8: 290. 1870.

Linosyris squamata Palmeri A. Gray, Proc. Am. Acad. 8: 290. 1870.

Tetradymia squamata A. Gray, Proc. Am. Acad. 9: 207. 1874.

Type locality: "Low hills of the Sierra Santa Monica, Los Angeles Co., California." When Dr. Gray first published his diagnosis of this species he had only two specimens in his herbarium. One of these, collected by Brewer on "low hills of the Sierra Santa Monica, Los Angeles Co., California," was placed in the variety *Breweri*; the other, collected on the "desert of the Colorado, Arizona, 1870 [by] Dr. E. Palmer," became his second variety, *Palmeri*. This treatment, fortunately seldom practiced by Dr. Gray, left no specimens to represent the typical species. We are therefore obliged to consider the Brewer plant as the type of the species, reducing the varietal name to synonymy. The desert form, *Palmeri*, does not seem distinct.

Distribution: Southern Monterey County, southward to Lower California, and eastward to Arizona. Dry sandy washes in the Upper and Lower Sonoran.

Specimens examined: Fort Tejon, Heerman; Rothrock 276;

Sierra Santa Monica, *Brewer* 71 (type); San Gabriel Canyon, *Abrams* 885; San Antonio Canyon, *Baker* 3466; Santiago Canyon, Santa Ana Mountains, *Helen D. Geis* 576; vicinity of San Bernardino, *Parish* 4202, 5130; foothills of the San Bernardino Mountains, *S. B. & W. F. Parish* 583; Riverside, *Hall* 1367; Mohave Desert, *Brandege*; wash near Monrovia, *Dudley*, Nov. 13, 1907.

17. PEUCEPHYLLUM.

1. PEUCEPHYLLUM SCHOTTII A. Gray, Bot. Mex. Bound. 74. 1859.

Psathyrotes Schottii A. Gray, Proc. Am. Acad. 9: 206. 1874.

Inyonia dysodioides M. E. Jones, Cont. W. Bot. no. 8: 42. 1898.

Type locality: "Diluvial banks of the Colorado, in Sonora."

Distribution: Inyo County, southward through the desert region to Lower California and Sonora. Lower Sonoran.

Specimens examined: Los Palmas, *Hall* 5849.

18. TETRADYMIA.

Heads 4-flowered; plants not spinescent.

Leaves permanently canescent.

1. *T. canescens*.

Leaves glabrate.

2. *T. glabrata*

Heads 5-9-flowered.

Stems clothed with slender spines; leaves not spinescent-tipped.

Achenes canescent but glabrate.

3. *T. stenolepis*.

Achenes with long, soft wool.

4. *T. spinosa*.

Stems without spines; leaves spinescent-tipped; achenes with long, soft wool.

5. *T. comosa*.

1. TETRADYMIA CANESCENS DC. Prod. 5: 440. 1837.

Type locality: "In Americae borealis ora occidentali ad Columbia River."

Distribution: Eastern Washington and Idaho, southward to the mountains of southern California. Arid Transition.

Specimens examined: Mount San Antonio, *S. B. & W. F. Parish* 561; Bear Valley, *Abrams* 2913, 2135; Mount San Antonio, *Abrams* 2693; Water Canyon, Tehachapi Mountains, *Abrams & McGregor* 469.

2. TETRADYMIA GLABRATA A. Gray, Pacif. R. Rep. 2: 122, pl. 5. 1854.

Type locality: "On the Sierra Nevada."

